No. III. January, 1842.

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JOURNAL

OF THE

BOMBAY BRANCH

ROYAL ASIATIC SOCIETY.

JANUARY—1842.

ART. I.—*Inscription on a block of black stone to the left of the eastern entrance of Ray Khimgàr's Mahal at Girnar. Communicated by Capt.* LE GRAND JACOB, *translated by* BALL GANGADHAR SHASTRI, Esq.

The first verses of this inscription have baffled the endeavours of the translator to understand them: with regard to the whole he has attempted to give a literal translation; but he offers to the public the sense as he has understood it. Under such circumstances some will perhaps consider that we have not acted wisely in publishing it. But when it is considered that the Indian history of Guzerat is in much obscurity, and that monumental testimony to history is of the utmost value, we hope that the publication of such fragments will stimulate the zeal of our correspondents to greater exertions. We take this opportunity of mentioning that our museum possesses coins of only four of the Indian Sovereigns of Guzerat. One is new. No doubt some of our friends will furnish us with the means of examining what has already been accomplished in the sister presidency for us; in order that we also may do our part to facilitate research.

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4. Let us praise Ambicá, whose fame has spread through the universe; and whose son conquers elephants in the form of obstacles, and like Mácandaja plant, grants and fulfils the petitions addressed to him. 5. Let us sing of the famous lord of mountains—and the gods of whom Indra is the chief, will attend the men who are busy

in the practice of pious rights and virtue. 6. That king of mountains —Raivat, incomparable ornament to the kingdom of Saráushtra, embellished by various places of sanctity, gardens, rivers, forests, delightful places, and numberless other conveniences provided by kings. 7. Do not, O mountain of the gods! indulge vanity; for how many like the sun and moon, the creators of delight, are not set to revolve by thee? There shines with glory, one mountain, Raivat, by the sight of which human beings laying aside all the revolutions of the heart (distresses or doubts) attain supreme felicity, happiness, and prosperity. 8. On this mountain is established the race of Hari whose branches extend far and wide, (which) is the depository of the grandeur of the gods; and the pure offspring of which Achyut, Bala and others, being themselves freed from sin, shed pure influence over others. 9. In this race of the younger chief of Yadus, distinguished for formidable bravery, there was a famous family known as Yadavas, overflowing in streams of virtues, in which flourished Mandalika, before whose feet bowed all kings, and who constructed the temple of Nami with large golden leaves. 10. There was the king Navaghana, the son of Dípa, who delighted in the assembly of venerable men; pleased his subjects with showers of rain descending from youthful clouds; had eyes like Sarasa (bird) and was amiable by his reputation. 11. Mahipala Deva was the lord of the earth, whose royal son was Depada —whose slavery was accepted by the law of the gods and the desire-yielding tree of heaven. He was the maker of the edifice of Somanátha in Prabhása. 12. There was also Khangára, lord of the earth, who was a Khangára (fire) on the tree of the enemy's dominions, adorned the prosperity of his royal house; and served as a stream of water poured by a golden vase over the Mundane plant. 13. The king Shri Jayadeva Sinha, whose eyes were moistened and intoxicated with the stream of the enjoyment of the bright pleasures afforded by earth; the magnitude of whose glory dazzled the enemies; and whose feet were washed by the fluid radiating from the gems on the brilliant crowns of kings who humbled themselves before them. 14. After him flourished Makala Sinha, the lion in destroying the elephants in the form of enemies; whose glory was partaken by the sun; and who shone like a beautiful Hansa on the lotus-like mind of the virtuous. 15. After him was born king Melagadeva, who acted like a black-bee on the lotus-like feet of Bhava (Mahadeva) and was possessed of excellent personal accomplishments. (A foot is here omitted). 16. There was king Mahipáladeva, wonderful with

the glory shining over his feet which resembled the brow of Udaya, the eastern hill; who shone over other kings, overcome by tributes that had been imposed upon them; as the sun shines over mountains illuminated by his rays spreading in all directions; who destroyed the hostile kings, and resembled the sun; who expels darkness in destroying the gloom of immorality. 17. His son Mandalika shines and creates terror to enemies as a lion to elephants. His fame having plunged in the heavenly rivers, has crossed the circuit of the oceans. 18. There flourished after him Mandalika, under whom kings of kings had taken refuge. (The rest of this verse is inaccurate.)

19. The arm of Mandalika is resplendent—a time post of the elephant like victory, the bridge of the ocean of happiness, the moon emanating from the churning of the ocean of bravery, the eastern halo of the rays of glory, the mitigator of widowhood to the queens of his enemies. 20. O hostile kings! I could give you some good advice. Look, what is before you. This is the dust agitated by the footsteps of the horses of Mandalika, which overspreading the earth cast a gloom over all. O! leave off rashness and accept the service of Mandalika. 21. It is but a display of the wisdom of Brahma that he has created the Divine cow, the gem, and the trees of rough and woody structure; for having seen Mandalika so devoted to liberality, what occasion can there be for producing them?

ART. II.—*Inscriptions from Palitana.*

No. II. Inscriptions recording the benefactions of the Emperor Akbar to Palitana and to the Jains.

ओंनमः श्रेयश्री प्रथमः प्रभुः प्रथिमभागोनेन पुण्यात्मनामस्तु स्वस्तिकरः सुखाब्धिमकरः श्रीमारुदेवः सवः पद्मोल्लासकरः करैरिवरदिव्योंम्निक्रमांभोरुह न्यासैर्यस्तिलकूबभूवभगवान्शत्रुंजयेनकशः १ श्रीसिद्धार्थनरेशवंशसरसीजन्माब्जिनीवल्लभः पायाद्दः परमप्रभावभवनश्रीवर्धमानप्रभुः उत्पत्तिस्थितिसंहतिप्रकृतिवाग्यद्गीर्जगत्पावनी स्वर्वापीवमहाव्रतप्रणयभूरासीद्रसोल्लासिनी २ आसीद्दासववृंदवंदितपदद्वंद्वः पदं संपदां तत्पट्टांबुधिचंद्रमागणधरः श्रीमान् सुधर्माभिधः यस्यौदार्ययुता प्रहृष्टसुमनाअद्यापि विद्यावती धत्तेसंततिरुन्नतिं भगवतोवीरप्रभो-

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१ रद्दि read रवि, कू read क, व read वः

२ पायाद्दः read पायाव्दः स्वर्वापीव read स्वर्वापी

मौरिव ३ श्रीसुस्थितः सुप्रतिबुधपत्तौ सूरीअभूतांतदनुक्रमेण याद्भ्यागण्योद्‌
भूदिहकोटिव्ह चद्रार्यमभ्यामिव सुप्रकाशः ४ तत्राभूद्वज्रिणार्वयः श्रीवज्रर्षिगणा-
धिपः मूलंश्रविज्रशाखाया गंगायाहिमवानिव ५ तत्पट्टांबरदिनमणि रुदितः-
श्रीवज्रसेनगुरुरासीत् नागेंद्रचंद्रनिर्वृति विद्याधरसंज्ञिकाश्च तच्छिष्याः ६ स्वस्व-
नामसमानानि येभ्यश्चत्वारिजज्ञिरे कुलानिकाममतेषु कुलंचांद्रंतुदिद्युते ७ भास्क-
राइवातिमिरं हरंतःख्यातिभाजनं भूरयस्तत्र (बहवो) जज्ञिरेजगतामताः ८
बभूवुःक्रमतः सूत्रश्रीजगच्चंद्रसूरयः येस्तपाभिरुदंलेभे बाणासिन्धा ६ र्क १२८५
वत्सरे ९ क्रमेणास्मिन्गणेहेमविमलाः सूरयोभवन् तत्पट्टेसूरयोभूवन्नानंदविमला-
भिधाः १० साध्वाचारविधिः पथः शिथिलितः सम्यक्क्रियाधामयै रुद्धेस्तन-
सिद्धसायकसुधारोचिर्निभे १५८२ नेहसि जीमूतैरिवयैर्जगत्पुनरिदंतापंहरत्भि
र्भृशं सश्रीकंविदधेगवाश्रुवितमैः सोमैरसोल्लासिभिः ११ पद्माश्रयैरलमलंक्रिय-
तेस्मतेषां प्रीणन्मनांसिजगताकमलोदयेन पट्टःप्रवाहइवनिर्जरनिर्झरिण्याः शुद्धात्म-
भिर्विजयदानमुनीशहासैः १२ सौभाग्यंहरिसर्वगर्वहरणंरूपंचरंभापतिश्रीजैत्रं
शतपत्रभित्रमहसाचौरंमतापंपुनः येषांवीक्ष्यसनातनंमधुरिपुस्वःस्वामिघर्मांशवो
जाताःकाममपित्रपाभरभृतोगोपत्वमापास्त्रयः १३ तत्पट्टःप्रकटः प्रकामकलितो-
द्योतस्तथासौधवत् सत्स्नेहैर्यविराजहीरविजयस्नेह यैनि मे सौभाग्यंमहसाभरेण
महतामत्यर्थमुल्लासिनां बिभ्राणः सयथाजनिष्टसदृशांकाममप्रसादास्पदं १४
देशाद्गुर्जरतोथसूरिवृषभाआकारिताःसादरं श्रीमत्साहिअकब्बरेणविषयंमेवात-
संज्ञंशुभम् प्रा—— जपाणयोवतमसंसर्वेहरंतोगवां स्तोमैःसूत्रितविश्वविश्वकम-
लोल्लासैर्नभोर्काइव १५ चक्रुःफतेपुरम—भौमदृग्युग्मकोककुलमाप्तसुखंसृजंतः

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१ पद् read पदं

४ अभूता read अभूतां, यादभ्या read याभ्यां, मभ्या न्दः should be omitted.

८ स्तपां भिरुदं read विरुदं स्तपो ११ in lacuna supply र
१५ in lacuna supply त्यांबु

अष्टैकपावकनृपप्रमिते १६३९ स्वगोभिः सोल्ला—बुजकाननंये १६ दामेवाखि-
लभूपमूर्द्धसुनिज्ञामाज्ञांसदाधारयन्श्रीमान्शाहिअकब्बरोनरवरोदेशेष्वशेषेष्वपि
षण्मासाभयदानपुष्टपटहोद्घोषानघध्वांसिनः कामंकारयतिस्महृष्टहृदयोयद्वाक्कु-
लारंजितः १७ यदुपदेशवशेनमुदंदधान्निखिलमण्डलवासिजनेनिजे मृतधनंचक्क-
रंचसुजीजिआभिधमकब्बरभूपतिरत्यजत् १८ यद्वावाकतकाभयाविमलितस्वा-
तांबुपूरःकृपा पूर्णःशाहिरनिंद्यनीतिवनिताक्रीडाकृतात्मात्यजत् शुल्कंत्यक्तुमशा-
क्यमन्यधरणीराज्ञांजनप्रीतये नद्वान्नीडजपुंजपूरपशूंश्चामूमुचद्भूरिशः १९ यद्वा-
चानिचयैमुधाकृतसुधाधारैरमंदैःकृता ल्हादःश्रीमदकब्बरक्षितिपतिः संतुष्टिपुष्टा-
शयः त्यक्त्वातत्करमर्थसार्थमतुलंयेषांमनःप्रीतये जैनेभ्यः—प्रददौचतीर्थतिलकं-
शत्रुंजयोर्वीधरं २० यद्वाग्भिर्मुदितश्चकारकरुणास्फूर्जन्मनाःपौस्तकं भांडागार-
मपारवाङ्मयमयंवेश्मेववाग्देवतं यत्संवेगभरेणभावितमतिः शाहिःपुनःप्रत्यहंपूता-
त्माबहुमन्यतभगवता—दर्शनम् २१ यद्वावातरणित्विषेवकलितोल्लासंमनः
पंकजं बिभ्रच्छाहिअकब्बरोव्यसमधिपाथोजिनीचंद्रमाः जज्ञेश्राद्धजनोचितेश्चसुकृतेः
सर्वेषुदेशेष्वपि ख्यातोर्हंतभक्तिभावितमतिः श्रीश्रेणिकक्ष्मापवत् २२ लुंपाका
धिपमेघजीऋषिमुखाहित्वाकुमत्याग्रहं भेजुर्यच्चरणद्वयीमनुदिनंभृंगाइवांभोजिनीं
उल्लासंगमितायदीयवचनैर्वैराग्यरंगोन्मुखे जाताःस्वस्वमतंविहायबहवोलोकास्त-
पासंज्ञका २३ आसीच्चैत्यविधापनादिसुकृतक्षेत्रेषुवित्तव्ययो भूयान्यद्वचनेनगु-
र्जरधरामुख्येषुदेशेष्वहलं याशंगूर्जरमालवादिकमहादेशोद्भवैर्भूरिः संघैःसार्द्धमृ-
षीश्वराविदधिरेशत्रुंजयेयेगिरौ २४ तत्पट्टमब्धिमिवरम्यतमंसृजंतः स्तोमैर्गवा-

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१६ in lacuna supply चात्र मुखानि, अक्षे read वर्षे, in lacuna supply समादधुरत्यां

१७ the lacuna appears erroneous, चसि read चंस.

१८ lacuna appears superfluous.

१९ lacuna should be omitted.

२० in first lacuna supply चारे

सकलसंतमसंहरंतः कामोल्लसत्कुवलयमणयाजयंतिस्फूर्जत्कलाविजयशेनमूर्नी-
द्रचंद्राः २५ यत्प्रतापस्यमाहात्म्यंवर्ण्यतेकिमतःपरं अस्त्रमाश्चक्रिरेयेनजीवंतोपिहि
वादिनः २६ सौभाग्यंविषमायुधात्कमलनीकांताच्चतेजस्विता मैश्वर्यंगिरिजापतेः
कुमुनीकांतात्कलामालितां माहात्म्यंधरणीधरान्मखभुजांगांभीर्यमंभोनिधे रादायां-
बुजभूःप्रभूः प्रविदधेयन्मूर्तिमेतन्मया २७ येचश्रीमदकब्बरेणविनयादाकारिताः
सादरं श्रीमल्लाभपुरंपुरंदरपुरंव्यक्तंसुपर्वोत्करैः भूयोभिर्व्रतिभिर्बुधैःपरिवृतोवेगाद-
लंचक्रिरे सामोदंसरसंसरोरुहवनंलीलामरालाइव २८ अर्हंतंपरमेश्वरत्वक-
लितंसंस्थाप्यविश्वोत्तमं साक्षात्साहिअकब्बरस्यसदसिस्तोमैर्गवामुद्यतः येसंमी-
लीवलोचनाविदाधिरेइत्यक्षशूरैश्रिया वादोन्मादभृतोद्विजातिपतयोभट्टानिशाटा-
इव २९ श्रीमत्साहिअकब्बरस्यसदसिमोत्सर्पिभिर्भूरिभि र्वादैर्वादिचरान्विजि-
त्यसमदान्सिंहेद्विपेंद्रानिव सर्वज्ञाशयतुष्टिहेतुरनघोदिश्युत्तरस्यास्फुरन् येःकैलास-
इवोज्वलोनिजयशः स्तंभोनिचख्नेमहान् ३० दत्तसाहसधीरहीरविजयश्री-
सूरिराजापुरा यत्क्षोशाहिअकब्बरेणधरणीशक्रेणतत्प्रीतये तच्चक्रेखिलमप्ययबाल-
मतिनायत्साजमत्साक्षिकं तत्पत्रंफुरमाणसंज्ञमनघंसर्वादिशोव्यानशे ३१ किंच
गोवृषभकासरकांता कासरायमगृहंनहिनेयाः मोच्यमेवमृतवित्तमशेषंबंदिनोपिहिनच
ग्रहणीयाः ३२ यत्कलासलिलवाहविलासपीतचित्ततरुणाजनतुष्ट्यै स्वीकृतं-
त्वयमकब्बरधात्रीस्वामिनासकलमेतदपीह ३३ चोलीवेगमनंदनेनवसुधाधिशेनस-
न्मानितागुर्वीगुर्जरमेदिनीमनुदिनंस्वर्लोकविब्बोकिनीम् सद्वृत्तामहसांभरेणसुभगागा-
ढंगुणोल्लासितो येहाराइवकंठमंबुजदृशांकुर्वंतिशोभास्पदं ३४

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२४ for भूरि : read भूरिभिः

२७ for त्वमलमो read कमालिनो, प्रभूः read प्रभः

२९ for संमीलीव read समीलित.

No. III. Inscription commemorating the benefactions of the goldsmith Tejpal to the temple of Palitana.

इतश्च आभूरान्वयपद्मपद्मसवयाउकेसवंशेभवे श्रेष्टीश्रीशिवराजेद्दत्यभिधया-
सौवर्णिकःपुण्यधी[2] तत्पुत्रोजनिसीधरश्चतनयस्तस्याभवत्पर्वतः कालाव्होजनितत्सुत-
श्चतनुजस्तस्यापिनाथाभिधः ३५ तस्याभूद्वळिआभिधश्च तनुजख्यातोरजाई
भवतस्याभूच्चसुहासिनीतिगृहिणीपद्मेवपद्मापते[4] र्ण्मिसुरराजयोरिवजयःपुत्रस्तयो-
श्चाभवत्तेजःपालइतिप्रहृष्टसुमनाःपित्रोर्मनः प्रीतिकृत् ३६ कामस्येवरतिर्हरेरिवरमा-
गौरीवगौरीपतेरासीत्तेजलदेइतिप्रियतमातस्यै कृतिः भोगश्रीसुभगौगुरौप्रणयिनौ-
शश्वत्सुपर्वादरौपौलौमीत्रिदशेश्वराविवसुखंतौदंपतीभेजतुः ३७ वैराग्यवारिनि-
धिपूर्णनिसाकराणां तेषांबहीरविजयव्रतिसिंधुराणां सौभाग्यपरभागविभासुराणां
तेषांपुनर्विजयसेनमुनीश्वराणां ४८ वाग्भि[8] र्मुधाकृतसुधाभिरुदंचितेत्ताः श्राद्धः
सशोभनमनाभजतिस्मभावं श्रीसंगभक्ति नदानजिनेंद्रचैत्यो द्धारादिकर्मसुभृशं
सुकृतिप्रियेषु ३९ विशेषकं ॥ प्रहैःप्रशस्तेन्हिसुपार्श्वभर्तु रनंतभर्त्तुश्चशुभांप्र-
तिष्ठां सोचीकरत्षड्युगनृपं १६४६ वर्षे हर्षेणसौवर्णिकतेजपालः ४० आदा-
वीर्षभिरत्रतीर्थतिलकेशत्रुंजये ६ चीकरं[10] स्सौयंशैत्यकंरदृशोर्मणिगणस्वर्णादिभिः
र्भासुरं अत्रान्येपिभुजार्जितांफलवतीमुच्चैःसृजंतःश्रियं प्रासादंतदनुक्रमेणव-
दश्चाकारयन् भूभुजः ४२ तीर्थेत्रसाधुकरमाभिधोधनीसिद्धिसिद्धितिथि १५८८
संख्ये ॥ चैत्यमचीकरदुक्तें रानंदविमलमुनीराजां ४३ तंवीक्ष्यजीर्णभगवद्वि-
हारंसतेजपालः स्वहृदीतिदध्यौ भावी[11] कदासौ ६वसरोवरीयान् यत्रा६त्रचैत्यं-
भवितानवीनं ४४ अन्येद्युस्वगुरु[12]पदेशशारदाकामंवलक्षीकृतौ[13] स्वांतंभाःसवाणिगवरःपु-

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१ भवः	२ धीः	३ ईभवः	४ इंद्राणो
५ प्रसन्नात्मनिः	६ सौभाग्यरूप	७ मुंधा	८ धन
९ भूप	१० चैत्यं	११ भावी	१२ गुरु

१३ स्वांताभाः

रतरेश्रीस्तंभतीर्थेवसन् तीर्थश्रीमतितुंगतीर्थतिलकेशत्रुंजयेहर्द्गृहे द्वारंकर्तुमना-
भजायततमासाफल्यामिछन्श्रियः ४५ अत्र स्यात् सुकृतं कृतं तनुमता श्रेयः
श्रियांकारणं मत्वेवंनिजपूर्वजव्रजमहानंदप्रमोदाप्तये तीर्थेश्रीविमलाचलेतिविमले-
मौलेर्हतोमंदिरे जीर्णोद्धारमकारयत्ससुकृतीक्रंतीतनुर्जन्मवत् ४६ शृंगेणभिन्नगग-
नांगणमेनदुच्चै श्चैत्यंकारितशिखरसि[1] तहेमकुंभं हस्तेषु ५२ हस्तमितमुच्च-
मुपैतिनाक लक्ष्मींविजेतुमिवकामममर्त्यवर्गेै ४७ यत्रार्हदोकसिजितामरकुम्भिकुंभाः
कुंभाविभातिशरवेदकरेंदु १२४५ संख्याः किंसेवितुंप्रथमगुःप्रचुरप्रताप पूरैर्जि-
तादिनकराःकृतनैकरूपाः ४८ उन्मीलितप्रदभूमिरुहानशेषान् विश्वेषुविघ्नकरि-
णोयुगपन्निहंतुं सज्जास्मइत्थमभिधातुमिवेंदुनेत्रा २९ सिंहाविभान्युगताजित
धाम्नियत्र ४९ यौगिन्योयत्रशोभंते चतस्रोजितवेश्मनी निषेवितुंमं वाक्रांताः
प्रतापो राागतादिशः ५० राजंतेचदिशापाला——यत्रार्हदालयेमूर्त्तिमंतः
ष्कि मायाता धर्मा[10] स्संयमिनाममी ५१ द्वासप्ततिःश्रियमयंतिजिनेंद्रचंद्र-
बिंबानिदेवकुलिकासुविताववतीषु[11] द्वासप्ततेःश्रितजिनालिकलालतानां किंकुड्मला
थ्येरिमलेभुवनंभरंतः ५२ राजतेयत्रचत्वारोगवाक्षाजिनवेश्मनि विरंचेरिववक्त्रा-
णि विश्वकारणहेतवे ५३ यत्रचैत्येविराजंतेचत्वारश्चतपोधनाः अमीधर्माःकिमा-
याताःप्रभुपास्त्येवपुर्भृतः ५४ पं[13] चालिकाःश्रियमयंतिजिनेंद्रधाम्नि[14] द्वात्रिंशदिंद्र-
रमणीभरजैत्ररु[15] पाः ज्ञातापतीनिहाजिनेकिमुलक्षणक्ष्मा राजाप्रियानिजनिजेशानि
भालनोक्ताः ५५ द्वात्रिंशदुत्तमतमानिचतोरणानि राजंतियत्रजिनधाम्निमनोहराणि
किंतीर्थकृद्ध्यानलक्ष्मी[16] मृगेक्षणाना मंदोलनानिसरलानिसु[17] शानानि ५६ गजाश्वतु-

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१ Doubtful. २ स्थित ३ सेवाःसिंहाविभांत्यपगता
४ योगिन्यो ५ जिनवेश्मनि ६ सिवा
७ मागता ८ पाला:प्राप्ते ९ नःकिमायाता
१० धर्माः ११ Doubtful. १२ ताः परिमलैर्भु
१३ पांचालिकाः १४ धाम्नि १५ रूपाः
१६ लक्ष्मि १७ दर्श

त्रिंशतिरऽद्रितुंगा विभांतिश[१०] न्नाजिनधाम्नियत्र दवाश्चतुर्विंशतिरीशभक्त्यैकिमा-
गताःकुंजररूपभाजः ५७ स्तंभाश्चतुःसप्ततिरद्रिरा[११]जातुंगाविभांतीहजिनेंद्रचैत्ये
दिशामध्धीशैःसहसर्वइंद्रा[१२] किमागभक्त्यैसमुपेयिवांसः ५८ रम्येनंदपयोधिभूप-
ति १६४९ मितेवर्षेसुखे[१३]नकृत् साहाय्याद्वजसुठक्कुरस्यसुकृतारंभिकपार्थोमु-
चःप्रासादंबळिआसुतेनसुधियाशत्रुंजयेकारितं दृष्ट्वाध्टापदतीर्थचैत्यतुलितंकेषान
चित्तेरतिः ५९. चैत्यंचतुर्णामिवधर्ममेदिनीसुजांगृहंप्रीणितविश्वविष्टपम् शत्रुंज-
योर्वीभृतिनंदिवर्धनाध्भिधंसदायछतुवांछितानिवः ६० भूयः प्रभाभरविनिर्मितनेत्र-
शैत्य चैत्यैध्त्रभूरिरध्भवद्विभवव्ययोयः ज्ञात्वावदंतिमनुजाइतितेजपालं कल्पद्रु-
मेत्ययमनेनधनव्ययेन ६१ शत्रुंजयेगगनबाणकला १६५० मितेब्दे यात्रांचकारसु-
कृतायसतेजपालः चैत्यस्यतस्यसुदिनेगुरुभिः प्रतिष्ठा चक्रेवहीरविजया ६ भि-
धसूरिसिंहैः ६२ मार्तंडमंडलमिवांबुरुहीसमूहः पीयूषरश्मिमवनीरनिधेःप्रवाहः
केकिव्रजः सलिलवाहमिवातितुंगचैत्यंनिरीक्ष्यमुदमेतिजनःसमस्तः ६३ चैत्यं-
चारुचतुर्मुखंकृतसुखंश्रीरामजीकारितं प्रोत्तुंगजसुठकुरेणविहितंचैत्यंद्वितीयंशुभं
रम्यंकुं[२]अरजीविनिर्मितम ६ भू चैत्यंतृतीयंपुन मूलश्रेष्टिकृतंनिकामसुभगंचै
त्यंचतुर्थंतथा ६४ एभिर्विश्वविसारिभिर्द्युतिभरैरध्यर्थसंसूत्रितोद्योतोदिक्ष्वखि-
लासुनिर्जरपतिः स्वर्लोकपालैरिव श्रीशत्रुंजयशैलमौलिमुकुटं चैत्यैश्चतुर्भिः
र्युतः प्रासादो[३] ६ गिमनोविनोदकमलाचैत्यंचिरंनंदतु ६५ वस्ताभिधस्यवरसूत्र-
धरस्यशिल्पं चैत्यंचिरादिदमुदक्ष्यनिरीक्षणीयं शिष्यत्वमिछतिकलाकलितोपिविश्व
कमास्यशिल्पपटलेभवितुंप्रसिद्धः ६६ सदाचराध्धीनाकमलविजयाव्हानसुधियां

१० Doubtful
११ राजोत्तुंगा
१२ इंद्राः
१३ सुखानंदकृत्
१ दमात्यय
२ कुंअरजी
३ प्रभूचैत्य
४ प्रासादोवि

पदद्वंद्वांभोजभ्रमरसदृशोहेमविजयः अलंकारिराज्यांस्त्रियमिवशुभायाविहितवान् प्रशस्तिःशस्तैषाजगतिचिरकालंविजयतां ६७ इतिसौवर्णिकसाहश्रीतजपालोद्धृत विमलाचलमंडनश्रीआदिशमूल प्रासादप्रशस्तिः श्रेयःबुधसहजसागराणां विनेयजयसागरोलिखेवर्णे शिल्पिभ्यामुत्कीर्णामाधननानाभिधाभ्यां ॥ श्री ॥ ६८ छ्राम् ।

Art. III.—*An Essay on the Language of the Aboriginal Hindus.*

By the Rev. Dr. Stevenson.

After carrying the study of the languages of continental India and the island of Ceylon to some extent, the student is apt to imagine that they are all mere corruptions of the Sanscrit, the language of the literature and religion of the Brahmans. A more critical examination of the subject, however, at last convinces him, that there are many words in common use, especially in the languages of Southern India, that cannot, after making every allowance for corruption, be derived from the Braminical tongue. He also finds that a great many of the words derived from the Sanscrit are used only by Brahmans, while others of the same meaning, but of a different origin, are constantly substituted by the common people. He farther observes that there are several Sanscrit letters which are never introduced into the spoken languages of India, or which if introduced, none but Brahmans can pronounce. Thus ऋ (ri) is by the common people always converted into रि (ri) or रु (ru), and the next three letters never enter into any of the spoken dialects; ष (sh) and क्ष (ksh) are changed to क (k), ख (kh), or स (s). Innumerable combinations of letters, such as ष्ट (sht), क्र (kr) र्म (rm), &c. are uniformly deprived of one of their members, or have a vowel interposed between the two consonants; and in the south of India several letters are used that are not found in Sanscrit. It is true that in all countries the pronunciation of the vulgar differs from that of the educated, but this difference usually appears least in the most characteristic sounds of a language. Thus in English the two sounds of *th* in *that* and in *thin*, both unutterable to a German or a Frenchman, are yet enunciated as correctly by every peasant, as by any lord; while no instruction can teach the uneducated adult, the polite pronunciation of the *m* in *aide de camp*

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५ लिपवर्णैन्ः

or of the *n* and *oi* in *sans froide*; words which belong only to the language of the higher classes in England, while on the other side of the channel they may be heard flowing with all their peculiar grace from the mouth of every peasant.

The existence of all of these circumstances, suggests the enquiry whether the words entirely foreign to the Sanscrit are mere vulgar terms, used at random in every particular province, without any connection with those used in other provinces, or whether they are the same or nearly so, in all the different spoken languages of India. A connection has indeed by many been shown to exist among the northern languages, and their relation to each other traced; and the same has been done in reference to the languages of the South. I am not aware however that the boundary line has been crossed, and the relation between the northern and southern family traced any farther than to show that the Sanscrit enters largely into them all. That part of these languages, which is not derived from the Braminical tongue, has never been traced through the spoken languages of India. Yet if we can trace a language wholly different from the Sanscrit in all the modern dialects, after separating also the easily recognized importations by the Mahomedan conquerors of India, it will seem to follow, that the whole region previous to the arrival of the Brahmans was peopled by the members of one great family of a different origin. That family may have been divided into different branches; one of these may have preceded the other in their migrations, yet oneness of language would seem to point to oneness of origin, especially since both history and tradition are silent as to any widespread influence exercised in ancient times, by any foreign tribe except the Braminical. I call the Brahmans a foreign tribe in accordance with indications derivable from the cast of their features, and the colour of their skin, as well as from their possessing a language which none of the natives of India but themselves can even so much as pronounce; and the constant current of their own traditions, making them foreign to the whole of India, except perhaps a small district to the north-west upon the Ganges. Even in the time of Manu, the whole country to the south of the Vindhya mountains and Nerbudda river, was inhabited by men who did not submit themselves to the Braminical institutions, and among whom he advises that no Brahman should go to reside.

Our inquiry then is in reference to the language spoken by these aboriginal Hindus, before they were subjected to Braminical influence.

Of this we mean to collect a few fragments yet to be found in all, or nearly all the present spoken languages of India. It may be necessary first of all, however, to state more explicitly that these languages, like those of modern Europe, may be divided into two great families, a northern, and a southern. The members of the northern family, while differing essentially from the Sanscrit, and agreeing with the southern in general grammatical structure, borrow most of their vocables from the Braminical tongue. The Hindí, which probably contains the most, is estimated by Mr. Colebrooke to have nine-tenths of its vocables of Sanscrit origin, and the Maráthí which contains the fewest has at least four-fifths of its words derived from the same source. In the southern family again, Sanscrit words are of rarer occurrence and enter less into the common language of the people, except in the Singhalese, which from the influence of the Páli, chiefly derived from the Sanscrit, and the language of the Budhistical literature, has nearly as many words originally derived from the Sanscrit as the Hindí itself.

The northern family may be considered as embracing the Hindí, with its dialects of Panjábí, Brij Bháshá, and Hindostání; the Bengálí; the Gujaráthí; the Márwárí; and the Maráthí. The Uríyá may be considered as a connecting link between the two families, though inclining perhaps somewhat to the Northern. The Southern family, is generally said to consist of the Telinga or Telugu, the Canarese or Carnática, the Tamil, and Malayálim. There are however besides these, two other languages spoken in small districts on the Malabar Coast, the Kokaní inclining to the northern, and the Tulu belonging decidedly to the southern family. The Singhalese also may be considered as a branch of the latter family, as well as the language of the Maldive islands.

The allied languages of Cutch, Scinde, and Affghánistan are plainly derived from the same original as the languages of India, though now abounding more or less with Persian vocables. The Nepalese, an Indian language, connects the languages of India with that of Tibet; and the Assamese another, forms the link between them and the language of Burmah. The numerous rude tribes inhabiting the hills and forests of India, have each a language of their own, of some of which small lists of words only have hitherto been published. The languages of the Malayan peninsula, and of Java, and the adjacent isles, though containing many words of Indian origin, are probably indebted for them to Indian traders, conquerors, legislators, and di-

vines, to whom the inhabitants owed, in ancient times, their civilization and literature. I have not the materials to enable me to embrace the whole of this extensive range of languages, and must confine myself chiefly to the Hindí, Bengálí, Gujáráthí, Maráthí, Telugu, Carnática, Támil, and Singhalese. Yet if it be considered that these are the languages of at least nine-tenths of the inhabitants of India, and will carry us in one unbroken line from Dondra head to the Himalayan mountains, and again in another line from the Brahmaputra river to the banks of the Indus; we cannot err much in applying conclusions drawn from them to the other languages of the plains, confessedly so similar in their vocabulary and construction to one or other of them. Larger and more numerous catalogues of the words used by the hill tribes would require to be compared with one another; and with the languages of the inhabitants of the plains, before any certain conclusions can be drawn from them. In those already published there is rather a striking resemblance to the languages of the Indian peninsula. Should I be favoured with catalogues of the languages of more of these tribes, I may probably again resume this subject in reference to them; and I am sure the conductors of our journal would welcome such contributions made by any, who have opportunities of furnishing them for publication.

I. There is then a great resemblance in the grammatical structure of the abovementioned eight languages.

1. In the inflection of nouns.

All are deficient in the number of cases required to mark the different relations of nouns, and supply the deficiency by particles, placed after the root or some of the cases.

In the letters that characterize the principal cases, there are several striking analogies running through most of the languages. Thus the letter *n* is a very general characteristic of the Genitive Singular. It enters into the Gujaráthí common genitive नो नी नु (*no ni nun*); the ancient Maráthí genitive चेनी (*cheni*), now usually contracted into चे (*che*); and into the Tamil इन (*in*); in all of which it runs through all the declensions. It is found also in the नि (*ni*) of the first of the three declensions in Telugu, and in the अन and इना (*ana* and *ina*) of the first and fourth of the four Canarese declensions. It is singular that in the Turkish the termination of the genitive *ung* should afford so near a parallel to the above; and that we should have the remains of such a genitive singular in *mine*, and *thine*; and the Germans in *mein*, *dein*, and *sein*. Again the letter *k* enters extensively

in these languages into the Dative Singular; Thus we have in Hindí को (*ko*), in Bengali के (*ke*), in Telugu generally कु (*ku*), in the Canarese second declension क्के (*kke*), and in the Tamil कु (*ku*). The Hindí Genitive in का की के (*ká kí ke*) may be a contraction of the Telugu योक्क (*yokka*); and the common change of क to ग gives us nearly the Singhalese गै (*gai*), and the Tibetan ग्ये or गे (*gye* or *ge*). The Maráthí ला (*lá*) of the Dative is the same as the Afghan ला (*lá*) used for pronouns, and nearly the same as the Tibetan ल (*la*). The simple lengthening of the short अ of the Nominative into आ in Maráthí, for the Dative and Accusative as is common in the ancient dialect, is the same process as that frequently employed in the Singhalese for the formation of the Accusative. The common Dative in the Singhalese is ट (*ta*); and in Pashtu त (*ta*); and in the old Maráthí dialect, the Accusative frequently, and sometimes the Dative is formed by the termination ते (*te*). In none of these instances is there an agreement with the Sanscrit, and coincidences so numerous and so minute, could scarcely result from mere accident, and therefore are probably the remains of the language spoken by the Hindus before they came in contact with the Brahmans; in which the affixed particles marking the relation of nouns were probably like our prefixed words *for*, *with*, *concerning*, all significant when separated, and the varieties now discoverable have been produced by the dropping in one language one syllable, and in another, another. That this is not mere theory may be seen in the old form of the Maráthí Dative, लागी (*lágí*) derived from the verb लागणे (*lágane*), to come in contact with, where we have their present Dative, and that of the Pashtu pronouns, and the Dative in the Tibetan language in the first syllable ला (*lá*); and in the second syllable the common dative in Canarese, by simply changing the vowel into that with which it is most often interchanged, giving us गे (*ge*); and by changing the consonant into its sharp we have the कि (*ki*) of the Telugu, and the chain of the analogy with the other languages mentioned above, established. That this word लागी (*lágí*) itself may be derived from the Sanscrit, is no objection whatever; for it may have been derived from a root common to many languages, and be just as independent of the Braminical tongue as our own word *lug*.

2. In turning from the noun to the verb we observe that the second person singular Imperative is the root, or shortest form to which the verb can be reduced; the letters of which in regular verbs appear

in all the Moods, Tenses, and Persons. This is so common in other languages that I should hardly have noticed it, had it not been that it takes place after every allowance, in only about one-half the conjugations and half the tenses in Sanscrit.

3. The Present Tense in common use in them all, contains the Present Participle, as a constituent part of it. In the Singhalese, Telugu, Carnática, and Tamil, that is, in the southern family, the Present Participle Active receives the signs of the persons as affixes, to form the Present Indicative. In the northern family generally, I believe, as in the Hindì, and with a Negative in Gujarathi, the Present Tense is formed by the participle, and the Substantive Verb as in our form *I am reading*. In the Maráthí, both forms are used according to the sense.

4. All of these languages, unless perhaps the Singhalese, agree in using an aorist, which denotes, Past, Present, or Future time, as the sense requires. In many of them, however, it is mainly confined to the ancient dialect, and only used in popular speech, as explained under the next head.

5. To the abovementioned aorist a Negative Particle may be affixed, so as to form what is called the Negative Verb. In the northern family the ना or न (*ná* or *na*), which expresses the negation is affixed to the signs of the persons, and never disappears. In the southern family on the contrary, the sign of the negation intervenes between them and the root of the verb, so that the अ (*a*) which was probably the original sign of negation, is in some of them, as the Canarese, entirely lost, and this negative verb becomes shorter than the affirmative. In the Japanese and Turkish languages, which follow the same plan, the *n* or *z* in the former, and the *m* in the latter never disappear; and even in the Tamil, the lengthening of the vowel before the signs of the persons, gives notice of the presence of the Negative Particle. To the observations under this head the Singhalese seems an exception, having no affix which it adds to the verb to deny the existence of the act.

6. In all of these languages the Past Tense of the Verb is marked by affixes and not prefixes as in the Sanscrit. In the Canarese the common sign is द (*d*), agreeing with the Turkish; and in one dialect of Gujarathi it is ध (*dh*). In the Tamil it is त or द (*t* or *d*), as in our own tongue. In the Telugu it is always त (*t*) agreeing in this with the German, though the German has also the prefixed reduplication, which allies it to the Sanscrit and Greek. There is one word

common in the ancient dialect in the Maráthí, which seems to me to furnish the key to all the discrepancies observable in the formation of the Past Tense in the modern Indian languages. It is the word दिधले (*didhale*), the past tense of the verb दे (*de*) give. In the Southern Gujaráthí the ध (*dh*), has been retained, and the ल (*l*), dropped. In the Canarese and other southern languages which abhor aspirates, it has been reduced to द (*d*), or changed to त (*t*). The common Maráthí and Bengálí have dropped the ध (*dh*), and retained the ल (*l*). In the Northern Gujaráthí and Hindí, the liquid ल (*l*), has been changed into its fellow liquid य (*y*), while in Urdu even this is usually dropped. Although only this one word in Maráthí retains the ध (*dh*), pure before ल (*l*), it exists in the corrupted form of त (*t*) in several words of very common occurrence in the language.

7. Almost all of these languages agree in forming an Infinitive of very popular use, by adding the same letters that are used for the formation of the Dative Singular of nouns. The Tamil makes the slight change from कु (*ku*), to क (*ka*). Such a form of Infinitive I need not say is quite unknown in Sanscrit.

8. All of the verbs in these languages are naturally destitute of a Passive voice. Awkward attempts by those who translate from the Sanscrit and European languages, have been made to supply its place by a Past Participle, and the verb *to go* in the Northern, and the verb *to fall* in the Southern family, but such forms never enter into popular speech, except in the neighbourhood of European stations. The natives have various ingenious ways of making up for the want of the Passive and say in their peculiar languages on the Ganges, in Maharástra, and in the Carnátic, *I have eaten blows*, instead of *I have been beat*. When other expedients fail them, instead of saying *it is reported*, they say *people report it*; using the Third Person Plural Active instead of the Passive.

9. In all of these languages, there is a great deficiency of verbs which is supplied in the popular speech by using nouns with the verbs, do, give, take, &c.

10. In the construction of these languages, either the Accusative, as in the Tamil, is occasionally used for the Nominative, or more generally as in most of the other languages the Nominative, especially of nouns denoting things without life, is used for the Accusative, or the Nominative and Accusative are the same; thus all, more or less, frequently disregard the distinction between the two cases.

Such are the most important particulars that my partial acquaint-

ance with several of these languages has permitted me to observe, as running through the whole, or nearly the whole of them, but they are surely sufficient to establish among them a strong family connection; and when it is remembered that for none of these characteristics are they indebted to the Sanscrit, it seems impossible to account for such a similarity to grammatical structure in languages spoken by people having so little intercourse with one another, as for ages the Hindu inhabitants of the north and south of India have had, unless we suppose it to arise from their all being originally of one family, and possessing one primitive language, the grammatical structure of which may be in some measure gathered from these their points of agreement. That Braminical influence has modified the grammatical structure, and introduced into the northern languages some affixes for those in former use, especially in the inflexion of nouns need not be denied; but the general structure of all has certainly remained unaffected, as there is about as much analogy in the construction of a Hindí or Maráthí sentence, to the Syntax of Sanscrit, as there is in that of a French or English sentence, to that of the Latin. Indeed upon the whole there seems more agreement in the construction with the Turkish than with the Sanscrit. And perhaps the original language of India may be the connecting link between what the Germans have termed the Indo-Germanic family, and the Turkish family of languages.

II. Having considered some of the points of agreement that the spoken languages of India have to one another in their Grammar, and argued from this consideration their common origin, I now proceed to bring forward some specimens of agreement in their vocabularies. Our task here is much more difficult, as the Sanscrit roots have such general meanings often attached to them, that by a little straining almost any thing can be deduced from them. It is probable also that the Sanscrit has adopted many words from the vernacular languages, which did not originally belong to it, and that it has been thus enriched by the spoils of the vanquished; just as the Latin of modern Europe has many words unknown to Cicero and Quintilian. We must however at present go on the supposition that all words found in Sanscrit Dictionaries are Sanscrit, and avoided as much as possible words which might seem derivable from Sanscrit roots, though this last consideration is of less importance, as the roots are not words, but the formations of Grammarians. The blanks in the following catalogue may often be the result of my ignorance, especially in the

Bengálí, and Gujaráthí, where I had but limited materials to work on; and indeed when I could connect the Hindí with the Maráthí, and that again with the Canarese, I felt less concern about the intermediate steps, considering that I had established sufficiently the analogy between the languages of the North and South. My authority for the Hindí, is Hunter's Dictionary, Calcutta 1808; for the Maráthí, Molesworth's, Bombay 1831; for the Telugu, Campbell's, Madras 1821; for the Canarese, Reeves', Madras 1832; for the Tamil, Rottler's, Madras 1834; for the Singhalese, Clough's, Colombo 1830; for the Bengálí, Marshman's English and Bengálí Dictionary, Serampore 1828; for the Gujaráthí, a small vocabulary printed at Bombay, and oral information. Except in this last instance, where I had no other alternative, I have never inserted meanings on my own authority, and have generally given the very words of the explanations I found in the abovementioned Dictionaries, respectively even when evidently synonymous, rather than run the risk of corrupting by endeavouring to harmonize them. I have sometimes been obliged a little to abridge them for want of space, and this is all the liberty I have taken. I have confined myself to forty primitive words, all expressive of such ideas as men must use in the infancy of society, or in the first stages of civilization, and which retain their places in a language from daily use, more firmly than any others. On these however many others depend. Thus for example I found by enumeration that No. 10 has given, as depending on it in the Hindí Dictionary, 12 words, in the Maráthí 40, and in the Támil 30, after separating carefully all words agreeing in sound, but not in meaning. Should each of the 40 words, in the following Table then have as is probable, on an average other 5 dependent on it, this will make the comparison extend to 200 words. A few of the most important of these derivatives as in No. 10, are occasionally exhibited, especially when they are useful for showing the connection between the different languages; but to have inserted them all, would have swelled this paper to too great a length, and to my mind at least would not have placed the connection between the different languages in so forcible a light, as by a few primitives brought together, as is here done, connected in one table. In order to simplify the subject as much as possible, I have used only the Devanagarí, and Roman Alphabets; I may therefore, after all the attention I have paid to ensure accuracy, have made some lesser mistakes in converting the words of the languages of Southern India, and writing them in characters differing from those

in which they are usually written, especially in the Tamil. I feel confident, however, that these errors will be found of a nature not at all affecting the general resemblance of the words in which they may occur to those with which they are compared. In conclusion I wish it particularly to be borne in mind that this paper claims no higher character than that of an Essay. Fully to discuss the subject would require a volume, and much more time than I can at present spare; new words and new analogies as the subject is prosecuted, constantly presenting themselves, all leading to the same general conclusion.

LIST OF

	Northern Family.				Southern Family.	
	Hindi.	Bangali.	Gujrathi.	Marathi.	Telugu.	Carnatica.
1	आपा. ápá. an elder sister.			आपा; आबा. ápá, ábá, sir, sire.	अप्प. appa. a father; an elder sister.	अप्प. appa. a father.
2	बाप; बाबू báp; bábú. father; sir, sire.	बाप; बाबा. báp; bábá. father; sire.	बाप; बा. báp; bá. father; sire.	बाप; बाबा, बापू. báp; bábá, bápú. father; sir, sire.	बाबु. bábú, father.	बाबा;बाबू. bábá, bábú, father.
3	काका; काकी. káká; kákí. pat. uncle; aunt.	खुडा. khuḍá; father's younger brother.	काका; काकी. káká; kákí. pat. uncle; aunt.	काका; काकी. káká; káki. pat. uncle; aunt.	कक्क. kakka. father.	कक्क. kakka. an uncle, a father's younger brother.
4	एडी. eḍí. the heel.	एडी. eḍí. the heel.	एडी. eḍí. the heel.	एड. eḍ. spurring with the heel.	आडगु; एडलु. aḍgu; eḍalu, a foot; to go.	अडी. aḍi. the foot.
5	पेट; पोटा. peṭ; poṭá; the belly, the womb; the stomach.	पेट. peṭ. the belly; the womb.	पेट. peṭ. the belly.	पोट. poṭ. the belly; the womb; the stomach.	पोट्ट. poṭṭa; the belly.	पोट्टे पोडे. poṭṭe, poḍe; the belly.
6	कुनबी. kunbí, an agriculturist.		कूणबी kunabí. a husbandman, the caste of cultivators of the soil.	कुणबी; कुळम्बी. kunbí, ku*l*ambí. a husbandman. कुळव. kulava. a harrow.	कोमटी. komtí. a branch of the 3rd caste. कुळ्ळगिंचु. kullaginchu. to dig slightly.	कुळ. ku*l*a. a farmer. कुळ्ळगिसु. kullagisu. to loosen the soil.

WORDS.

Southern Family.		Remarks.
Tamil.	Singhalese.	
अपन्; अपाम्. apan; apám. father; sire.	अप्पा. appá. a father.	I. Terms marking Relationship. No. 1. The Telugu and Maráthí give us the Aramean *Abba* unchanged. *Ab* and *Obo* are used among the Siberian Tartars: See Klaproth's As. Pol. The Coles S. W. Bengal use *apai;* the Himalayan Lepchas *abo;* the Murmis *aba,* and the Simbas *amba,* the word used by the Todas on the Nilgherry hills for mother is aph.
पापान्. pápan. holy father.	बप. bapa. holy father.	No. 2. The Turkish *Baba* is found in Bengali, Mar. Car. unchanged. The Greek *παπας,* Italian *papa,* are evidently the same as the Tamil *Pápán,* though this last seems confounded in the Dictionary with *Párápán,* the Tamil corruption of Brahman The Sanscrit अम्बा *Amba* comes so near the Himalayan *amu, a mi, amo,* and the Maráthí and Tamil *ayi,* the word for mother, that it is unsuited to our purpose.
	कुडप्पा. kuḍáppá. pat. uncle.	
आडि. aḍi. the foot.	अडि. aḍi. the feet.	No. 3. *Kaka* and *kaki* are used by the Coles; and in a little different sense, the former in Persian. The Singalese and Bengali are similar but peculiar. II. Parts of the Human Body.
पेर्रु. perru. bear a child. पेट्टापिले. petta pilai. own child.	फड्ड; बड. phaḍḍh; baḍ. the belly; the womb.	No. 5. Compare here the Persian پت put, the liver, and the Arabic بطن the belly. The connection with the San. पेट peta, a large basket, is too remote to suppose this word derived from it. The Hindi *petkabeta,* and Tamil *petta-pillai* for *own child* are very analogous.
कुळम्बु. kulambu. clay, loam. कोळु. kolu; a plough-share.	कुम्बर, कोम्बरु. kumbar, kombaru. a paddy field.	III. Trades and Professions. No. 6. In the Persian we have كوي *Kui* or *Koi* a farm, and كويلو *Koilu* a rustic, nearly connected; and more remotely the Sanscrit कु *Ku,* the earth, कुंभ *Kumbha,* an earthern pot, and कम्भार a potter.

LIST OF

	Northern Family.				Southern Family.	
	Hindi.	Bangali.	Gujurathi.	Marathi.	Telugu.	Carnatica.
7	कोली. koli; a weaver; [see the first Tamil, and first Mar. meaning.]	कोलहान. kolhán. the hill country of the Koles, S. W. Bengal. A Kole and a robber are there synonymous in the plains.	कोळी. a kolí. they are known chiefly as hunters and plunderers on the S. of Gujarath.	कोळी. kolí. a spider; a Koli; they are hunters, punderers, fishermen, and some are agriculturists.	कोल्ल kolla. plunder.	कोळु. kolu. plunder. कोल्लि. kolli. the act of killing.
8	ढोर. ḍhor; cattle.		ढोर. ḍhor. cattle; *i. e.* cows, and buffaloes.	ढोर. ḍhor. cattle, *i. e.* oxen and buffaloes.	तोर्रलु. torralu. cattle. दोड्डि dorri. a cow house.	दोड्डि. dorri. a cattle pound.
9	टट्टू. ṭaṭṭú; a poney.	टाटू. ṭáṭú. a poney.	तटू. taṭú. a poney.	तट्टू. taṭṭú. a small breed of horses.	तट्टु, तट्टव. taṭṭu, taṭṭava. a poney.	तट्टु, तटवानि. taṭṭu, taṭaváni. a poney.
10	आडा. áḍá. oblique. आड; áḍ. protection; a skreen. अडना. aḍna. to hinder.	आड. áḍ. oblique. आडाल. áḍal. a skreen.	आडो. áḍo. across. आड. áḍ. intervention. आडइ. áḍae. hindrance.	आडवा. áḍavá. across. आड. áḍ. protection. अडथल. aḍthal. hindrance.	अडमु. aḍamu. transverse. अंड. and protection. अड्डंकी. aḍḍangki. hindrance.	अड्ड. aḍḍa. transverse. अड्ड, कट्टु. aḍḍa kaṭṭu. to put a skreen. अडगाणिके. aḍgánike. hindrance.
11	उभ. ubh; oppressive heat.			उब. úb. sultriness.	उब्ब. ubba. oppressive heat.	उब्बे. ubbe. oppressive heat.

WORDS.

Southern Family.		Remarks.
Tamil.	Singhalese.	
कोलियण. koliyan. a weaver of the Pariah. caste. कोलैरुर. kolairur. huntsmen.	कोल्लय. kollaya. plunder.	No. 7. The Koli or Kole seems to be a branch of the aboriginal family, subsisting in various parts of the country. In the hilly regions in the interior they are known as huntsmen and plunderers; on the sea-coast as fishermen; in the plains on the Ganges and near Cape Comorin as weavers, and in the Deccan, on the Mahadeva hills, they have settled down to cultivate the soil. This word must not be confounded, as is sometimes done, with قلي *Cooley*, a porter.
तोरवु. torravu. a herd of cows. तोट्टि. toṭṭl. a pound.	तवलम्. tavalam. a flock, a herd.	IV. Domestic Animals. Nos. 8. and 9. If any animals can be said to be indigenous to India, the breed of cows with the hump between its shoulders, and the small breed of horses called tattoo, certainly belong to the number, as they are to be found abundantly, and quite naturalized in every part of the country.
तट्टु. taṭu. a country poney.		V. Natural States and Substances.
अटम्. aṭam, across. अड्कम्. aḍkam. enclosing, hiding. अडम. aḍam. hindrance.	अडय. aḍaya. a prop. अडस्सिय. aḍassiya. obstruction.	No. 10. This root आड *ád* in the sense of across is evidently the original word from which the others are derived. The Sanscrit अट्ट in the sense of overcome and अट going about, &c. seem quite different words, and enter into the Indian languages in the derivatives अट्ट an upper room, &c. There is also an Indian अट *At*, the same apparently as अड *Ad*. Compare also the Arab. ايد and English aid.
		No. 11. The Sanscrit word उष्ण *ushna* variously corrupted, but never losing the ण, or changing it only to न, is found in most of the languages and in a different shade of meaning from this word, which seems derived from a different root.

LIST OF

	Northern Family.				Southern Family.	
	Hindi.	Bangali.	Gujurathi.	Marathi.	Telugu.	Carnatica.
12	थंड. thand. Cold, calm.	ठान्ता. thántá. cold, cool.	थंड ताहाड. thánd, táhád cold, calm.	थंड. thand. cold, calm.	तण. tana. cool.	तण्ण. tanna cold, calm.
13	कचपच. kachpach crowded together.		कचवच. kachvach. crowded state.	कच. kach. crowdedness. गचाड. gachád. a thicket.	गच्चु पिच्चगु. gachchu pichchagu. to be thrown into confusion.	कच्चपचि. kachcbapachi. confusion; jellied-state.
14	कोरा. korá raw, new.	कारा. kárá raw.	कोरो. koro. raw, unbleached.	कोरा. korá. raw, unbleached.	कोरा. kora. unbleached.	कोर. kora. defective.
15	रेल rel. a flood, a string of animals.		रेल. rel. a flood.	रेल. rel. exuberance.	अल. al. a wave.	अल. al. a wave.
16	कंकर. kangkar. a nodule of limestone.	कंकर. kangkar gravel.	कांकरा. kángkará. gravel.	कंकर,कांकर kangkar, kángkar. gravel.	कंकर. kangkera. gravel.	कंकरे kangkare. gravel; hard sand.
17	उत्तु. uttu. plaits of cloth.			ओटी. oṭi. the robe gathered up to form a lap.	ओडि. odi. the lap.	ओट्टु. oṭṭu. to cast things into a corner.
18	ओप. op. polish; beauty.		ओप. opa. polish.	ओप. opa. polish.	ओप्पु. oppu. elegance; beauty.	ओप्प. oppa. well polished.
19	काठी. káṭhí. a saddle.		कंठाल. kanṭhál. a pack saddle.	कंठाळ. kanṭhál. a pack saddle.	कंठालमु. kanṭhalmu. a pack saddle.	कंट्टि. kanṭṭi. a pack saddle.

WORDS.

Southern Family.		Remarks.
Tamil.	Singhalese.	
तण. tan. cool.		
कसंगल. kasangal. the state of being squeezed.		No. 13. Tamulians confound the *ch* and *s*, so that the Sanscrit चण्ज and सण्ज are corrupted into the same word. Our Tamil word then is equivalent to *Kachangal.*
कुर्रै. kurrai. defect.	कोरदस. koradus. unripe grain.	
अलै. alai. a wave.	रल. ral. a wave; a flock.	No. 15. This word in Márathí means an overflowing abundance; and when on the Bali Pratipada, the Kunbis pray to have Bali's Kingdom restored, and all its accompanying blessings: the word by which they express these is रेल.
कंकम्. kangkam. crude arsenic.		No. 16. कंकर. in Sanscrit means buttermilk mixed with water, and for the Hindi कंकर the Sanscrit is कर्कर. The conversion of Reph into a nasal is, I believe, unprecedented, and therefore the word, though near, is still different, from the Sanscrit, especially as the nasal keeps its place in all the languages.
ओडुकिडम्. odukidam. a recess.	ओडोकुव. odokkuva. a place in the waist for money, &c.	
ओपु. opu. smoothness, beauty.	ओप. opa. glittering, v. polish.	No. 18. This seems a genuine aboriginal Indian word, probably connected with the Persian آب and Sanscrit आप:, the former word meaning both water and beauty; but the latter not used figuratively. The Singhalese to form the verb requires the auxiliary *to do.*
कंडालम्. kandalam. a pack saddle.		

LIST OF

	Northern Family.				Southern Family.	
	Hindi.	Bangali.	Gujurathi.	Marathi.	Telugu.	Carnatica.
20	कावर. kávar; the baskets in which Ganges water is carried about.		कावड. kavar. a lathe for carrying burdens. &c.	कावड. kávár. a lathe with slings attached at either end for carrying baskets, &c.	कावडि. kávari. a piece of wood made for being placed on the shoulder to carry burdens with ropes at each end	कावडि kavari. a split bambu with ropes attached at the ends for carrying burdens.
21	कुर्नी. kúrní. a scoop. कोडना koḍna; to scoop.	कुर्नी. kurní. a scoop.	कोयरु. koyaru. to scoop.	कोरणे. koranè. to scoop.	कोर्रकु. korraku. to gnaw; to grind.	कोरबु. korabu. to scoop out.
22	छाप. chháp. a stamp.	छाप. chháp. a stamp.	छापो. chhápo. a stamp.	छापा. chhápá. a stamp.	चप्पा. chappá. an impression.	चाप cháp a stamp. चापि. chápi. a floor mat
23	झोपडी. jhopaḍí; a hut.	झुपडी. jhupaḍí. a hut.	झोपडी. jhopaḍí. a hut.	झोपडी. jhopaḍí. a hut.		जोपडी. jopadi. a tent; a hut.
24	टट्टी. ṭaṭṭi. a skreen; a matted shutter.		टट्टी. ṭaṭṭi. a blind made of split bambus, &c.	तट्या. taṭya. a bambu mat.	तडक. taḍaka. a tutty; a straw blind.	तटिकि. taṭiki. a tatty or blind.
25	पोट. poṭ; a bale.			पोतें. pot e. a sack.	पोट्टमु. poṭṭamu. a small paper bag.	पोट्टण. poattan. a paper bag.

WORDS.

Southern Family.		Remarks.
Tamil.	Singhalese.	
का , कावडि. ká, kávari. a piece of wood with ropes attached, &c.	कवंदन. kavandan. a bullock's yoke.	
कोर्बु. korrabu. nibbling, as a mouse.	कुरुटु. kuruṭu. a rasp.	
चापै. chápai. a straw mat.		
-		
तटि. taṭi. a skreen.	तटिटु. taṭiṭu. a ceiling, a ship's deck.	
पोदि. podi. full sacks or bags.	पोदिय. podiya. a bale.	

VI. Artificial Productions.

No. 20. Something like the Kavar is used in England by the milkmaids. It is an exceedingly common contrivance for carrying light loads in India.

No. 21. The 2nd Pers. Sing. Imp. of the Singhalese verb is used the better to show the analogy. From the Sanscrit क्षुर to cut, comes क्षुरी, corrupted in Hindi to छुरी, so that it is not likely that this word is derived from that root.

No. 22. The Sanscrit चप means among other things to reduce to powder, a meaning never applicable in the vernacular tongues. If the Sanscrit is not misinterpreted, our word must be different. It is possible however that the sense given is borrowed by the author of the Dhátu Manjari from a hasty induction of words in the vernacular tongues, and that he should have given the idea of stamp, impression, &c.

LIST OF

	Northern Family.				Southern Family.	
	Hindi.	Bangali.	Gujurathi.	Marathi.	Telugu.	Carnatica.
26	मोटरा. moṭra. a bundle.			मुडा. muḍa. a packa ge. मोट्या. moṭyá. a porter.	मुड्डवु. muḍḍavu. a bundle of money, &c.	मोट्टे. moṭṭe. a burden; a bundle.
27	थेवा. theva. a stone set in a ring.		ठेव. ṭheva. a deposit.	ठेवणे. ṭhevané. to place.		
28	कनवंडा. kanvanḍa. diffident.			कनवाळु. kanválu. sympathizing.	कनिकरमु. kanikarmu. sympathizing	कनिकर. kanikar. pity.
29	मोटा. moṭá. fat.	मोटा. moṭá. fat.	मोटो. moṭo. large.	मोटा. moṭa. large, great.	मुदुरु. muduru. full growth.	माट. máṭa. handsome.
30	अटकल. Aṭkal. conjecture.	अटकल. aṭkal. conjecture.	अटकल. aṭka. conjecture.	अटकळ. aṭk al. conjecture	अट. aṭa. it is reported.	आडसटु. ṛdsaṭu. conjecture.
31	उभरना. ubharná. to overflow.		उभरावू. ubharávú. to overflow.	उबरणे. ubarané. to emit pus copiously.	उबुकु. ubuku. to overflow.	उबुकु. ubuku. to overflow.
32	उलटाना. ulaṭáná. to overturn.	उलटा. ulatá. turned over.	उलटा. ulaṭá. turned over.	उलटणे. ulaṭane. to turn over. उलट. ulaṭ. turned back as a wheel.	उरलु. uralu. to roll.	उरुलु. urulu. to roll, to turn round.
33	कच कच. kach kach. altercation.		कचकच. kach kach. altercation.	कचकच, कटकट. kach kach. kuṭkaṭ. wrangling.	कच्चे. kachche. a dispute.	कटकटेयु. kaṭ-kaṭeyú. teuzing.

WORDS.

Southern Family.		Remarks.
Tamil.	Singhalese.	
मुडिचु. mudichu. a bundle.		
तवट्टल. tavattal. a concealing, a staying.		
कण्णरालि. ka*nn*aráli. a melancholy event.	कनकल. kanakal. excellent.	VII. Qualities. No. 28. The root here is the Telugu कनु as a noun meaning the *eye,* and as a verb *to see* to *regard.* Thence these adjectives seem to be derived. The Sanscrit कण means the facet of a gem; and कनिका the pupil of the eye is more probably adopted from this than itself the root. At any rate no adjective, similar to those in the vernacular language derived from any of these words, exists in Sanscrit.
मोत्तमुट. mottamuta. the total.	मोनवट. monva*t*. beautiful.	
		VIII. Acts.
उबुकल. ubukal. overflowing.		No. 30. The Telugu अट is here again clearly the root of these words. No. 31. Compare here the Latin *Uber*.
उरुळ. uru*l*a. a wheel.		No. 32. The English *Whorl,* Sanscrit, वलय a bracelet, and वर्त्तुल a circle, may all have a distant connection with these words.
कटाकम्. katákam. disputation.		

LIST OF

	Northern Family.				Southern Family.	
	Hindi.	Bangali.	Gujuratui.	Marathi.	Telugu.	Carnatica.
34	कर कर. kar kar; immoderate laughter. कड़का. karaka; a crash.	कड़कड़. karkar. a rattling noise.	करकड़. karkar. a crash.	कड़कड़. karkar. sound of drums, &c. कड़ाकड़. karákar. a crash.	कड़ायमु. karáymu. violence.	कड़कु. karaku. exertion, joy.
35	गुड़गुड़ना. guḍguḍná. to rumble. गुड़गुड़ी. guḍguḍí. a small hookah.		गगड़वु. gagaḍavú to rumble.	गुड़गुड़णे. guḍguḍne to rumble. गुड़गुड़ी. guḍguḍí a hubble bubble.	गुटगुट. guṭ guṭ. the noise of boiling water.	गुडगुडि. guḍguḍi. the noise made by a hookah.
36	जोड़ना. joḍna. to join. जोड़ा. joḍa. a pair; a pair of shoes.	जोड़ा joḍa. a pair.	जोडो. joḍo. a pair.	जोडणे, joḍne. to join. जोडा. joḍá. a pair; a pair of shoes.	जोडु. joḍu. a pair; a pair of shoes.	जोडिसु. joḍisu. to unite. जोडु. joḍu. a pair; a pair of shoes.
37	ठेक. ṭhek. support.		ठेकवु. ṭhekavú. to support.	टेकणे. ṭekane. to place on a support.	टेकमु. ṭekamu. a banner.	टेके. ṭeke. a banner; an embrace
38	फिरना. phiraná to turn; to return.		फरवु. pharavú. turn round.	फिरणे. phirane. to turn; to turn away.	पिरि. piri. to separate one's self from another.	पिरि. piri. to separate one's self from another.
39	बोलना. bolana. to speak.	बल. bal. speak.	बोलवु. bolovú. to speak.	बोलणे. bolane. to speak.	बोल्लु? bollu. to boast.	बोलाविसु? bolavisu. to bless.

WORDS.

Southern Family.		Remarks.
Tamil.	Singhalese.	
कड्ग्रड्पु. kargarapu. a rattling sound like thunder.	करदर. kardar. teazing.	Nos. 33, 34, 35. The reduplicated form of these words is characteristic, and shows the close relation they have to one another; otherwise the two first might be easily enough traced to Sanscrit roots, and their belonging to the primitive Indian tongue not so evident.
कुडुकुडि. kuḍukuḍi. a hookah.		
चोडु. choḍu a pair; a pair of shoes.		No. 36. I do not know any instance of the conversion of ग to ड; so that this cannot come from the Sanscrit योग, which besides is a common word in many of the languages. Another singularity is the use of the term meaning *a pair*, as a specific word to denote a pair of shoes, but not any other specific pair.
तेकल. tekal. a being stayed.		
पिन्रु. pinru. retreat.	पेरल. peral. overturn.	38. This resembles in form the Sanscrit preposition परी, and the Greek *περι*. It agrees better in meaning with प्रति, though its being used as a verb, and inserting the इ after the first consonant are characteristic. In the northern tongues both परि and प्रति are extensively used by the educated, but never confounded with this verb.
पोलिप. polip. a brief explanation.	बोला. bola. a familiar term of address.	

LIST OF

	Northern Family.				Southern Family.	
	Hindi.	Bangali.	Gujurathi.	Marathi.	Telugu.	Carnatica.
40	मोडना. modana. to bend.	मोडा. moda. bend.		माडणे. modane. to break ; to bend.		मुरि. muri. to break to pieces.
41	अबे. abe. Interjection of scorn.			अबब. ababa. Interjec. of surprise.	अब्बब्ब. abbabba. Inter. of wonder.	अबा. abá. Inter. of wonder and grief.

WORDS.

Southern Family.		Remarks.
Tamil.	Singhalese.	
मुरि. muri. to break.	मडनवा. maḍanvá. to squeeze.	
अपा. apá. Inter. of grief.	अपोयि. apoyi. alas ! oh !	No. 41. I have added this interjection as running in somewhat different senses through the languages.

IV.—We have great pleasure in re-publishing the following Circular of the Royal Society of Northern Antiquaries, for which we are indebted to a distinguished member of that body now prosecuting researches in this Presidency.

"THE ROYAL SOCIETY OF NORTHERN ANTIQUARIES, founded with a view to increase and diffuse the knowledge relative to the Antiquities of Northern Europe, has endeavoured to attain its object by the publication not only of the most important ancient MSS. of Northern literature, together with translations of, and commentaries on them, but also of works illustrative of other objects of archæology. Of late years, however, the Society has turned its attention to those countries, of which the early history may be said to be of great importance to Northern Europe, as well as likely to receive light from it in return. The Society, therefore, has endeavoured to enter into a correspondence with learned men and scientific bodies in those countries, in the hope that the scientific advantages resulting from a steady and mutual co-operation will be found to be reciprocally beneficial.

The Society has already experienced that such a mutual co-operation tends to the happiest results,—and is therefore desirous to effect such an intercourse with Societies and learned men in Asia. For this purpose the Society has appointed a Committee, the object of which is to endeavour to throw light upon the relations which have existed of old between the North of Europe and Asia.

The inhabitants of the North of Europe belong to the stock of nations, which spread itself from the banks of the Ganges to the Atlantic Ocean. It is but natural, therefore, that there should be corresponding points between the various languages, which have had one source in common. Much has been done of late years towards finding out and proving such relation or coincidence; from these researches, however, the *Old Northern Tongue* has been excluded, although it is the only ancient Gothic language which we possess entire, and which in fact may still be called a living tongue; and although both in a grammatical and lexicographical point of view, it exhibits so many discrepancies from the other Gothic languages, and so many points of resemblance with the *old languag s of India and Persia,* that it is well worthy of a place in our disquisitions on comparative philology.

The old Northern tongue is preserved in its purity in the ancient poetry of the *Eddas*, in which is also preserved the Old Northern mythology, which has long been supposed and partly ascertained to have much in common with that of India and Persia, and wherein *Buddhism* also seems to have left its traces. At all events, these are subjects which lay claim to our serious attention, and to such a careful and close examination as will lead to a definite result.

But the Committee intends also to turn its attention to the practical life of these nations, whether public or private. It is not only the ancient forms of *Government*, *Worship*, *Ceremonies* and *Rites* or *Architecture*, which should be considered;—but also *Domestic life*, *Arms*, *Utensils*, whether of stone, bronze, copper, or iron; *Ornaments*, not only those of metal, but such as were made of amber, glass, etc. On all such matters a clear light will be thrown by a comparison with Asiatic antiquities.

From a remote antiquity commercial relations existed between Asia and the North of Europe. Abundance of *Cufic coins* and other matters are frequently discovered in excavations, which would seem to lead to the inference, that such commercial intercourse exerted no unimportant influence on the North, and likewise on the countries from whence the intercourse originated.

Such is the outline of the plan this Committee intends to follow in order to attain the object it has in view. But this it cannot effect alone and unaided. It wishes therefore to invite scientific societies and learned men in Asia to enter into correspondence with it, and to co-operate towards the attainment of an object, which is of the greatest importance to the common interests of science. Such a connexion may take place by a reciprocal interchanging of Dissertations inserted in the Transactions of the learned Societies in both countries; but chiefly by zealous researches on both sides, and by communication of all important facts—as well as by a mutual exchange of antiquities and writings of like import. Such a connexion, moreover, would afford other advantages to the learned of Asia and Europe, and would greatly facilitate the circulation of the various works of science which from time to time are published."

V.—*Ehrenberg on the Coral Islands and Banks of the Red Sea.*

(Continued from page 72.)

Of the general nature and formation of Coral Banks as hitherto known.

It appears that Mr. Strachan, an Englishman whose name is not much known, had discovered in the year 1702 * in Ceylon, that the coral animals were able, by mere activity, to form large masses of rock. "There is a great quantity of a kind of white coral upon the shore be-"twixt Galle and Matura—the Hollanders building houses and walls of "it. There are great banks of the said coral, and betwixt and upon these "grow others until it is become like a rock for thickness. These branches "are not softer when they are young than when they are ripe, yet "I have always observed a slime upon them when they are "under water, which I suppose is the substance which petrifies." Before him, Linschoten merely observed in the Mosambique Channel, 1599, that the corals appeared as masses of rock, and from the simple account he gives, it would appear that the term coral-rocks had been generally applied by seamen to the rocks of the South Sea, as early as the middle of the 16th Century; but I have not found proofs for it elsewhere. It is true Don Juan de Castro mentions, 1540, two sorts of corals in the Red Sea, but he did not think them identical with the banks which he calls rock.† In the year 1780 the ingenious and celebrated John Reinhold Forster of Dirschau near Danzig, who died as Professor in Halle, and who, with his son, had accompanied Cook on his second voyage round the world in 1772, first directed the attention of the public to the influence of the coral animals upon certain islands of the South Sea. From his own observations he was persuaded that they greatly co-operated in the formation of many isles. He thus expresses his opinion in his "Notes upon a voyage round the World," p. 20—"All "islands in the various seas which we have crossed, may be properly con-"sidered submarine chains of mountains, whose summits rise above the

* Some observations on Coral made in Ceylon—Philos. Transactions, vol. XXIII. pp. 1248, 1702.

† The same author speaks of red and white corals in the Red Sea, and Flarant von Poischis, 1598, also mentions red corals there, as Pliny had done before him. I have exchanged the Sicilian red corals in Massava for their weight in gold,—a sufficient proof that they are not now to be found there. What may those red corals have been? According to Poischis, p. 658, they were as thick as an arm; hollow and porous; consequently they must have been tuff corals, and not red corals. I have brought with me from thence a few specimens of the black coral celebrated from ancient times; they are of the Antipathes Isidis Plocamos, a form hitherto not scientifically known.

The red Coral of the Red Sea is undoubtedly the Tubipora Musicalis (T. Rubarrima of Ellis) which abounds on its shores; at Tejourra, and at Aden, from which there are specimens in the Museum, collected by Captain Young, I. N. The solid red Coral of commerce (Corallium Rubrum) is a production of the Mediterranean. It is imported into Bombay, but in small quantity.—*Editor.*

" water :" and in the part which is superscribed " System of the formation of Islands," page 126, he divides Islands into 3 classes, viz. 1, sand hills ; 2, mountainous islands with coral banks ; 3, mountainous islands without coral banks. According to him, all islands of the 2nd and 3rd classes show, with scarcely a single exception, plain vestiges of a former violent change of their surface by fire, or rather by volcanoes ; but all flat islands which belong to the first class, grow in the sea, or rather are the works of polypes, being raised by lithophytes from the bottom of the sea, and gradually spreading as they approach its surface. He thinks the banks built by coral animals always encircle a sea with abundance of fish, but their circles have frequently many openings. The bank, he imagines, is built by the worms perpendicular like a wall, until a little beneath the surface of the water. The waves drive sand, shell, sea-weed, and fragments of corals upon it, which raise the wall, until at last it rises above the water. The sea continues to accumulate firm particles upon it, and the waves and birds carry thither the seed of plants which grow on the shore : some of these, when they die produce mould, and if a cocoanut—which long retains the power of sprouting—should be driven upon it, it will become a tree, from which splendid forests of cocoanut-trees will afterwards spring. Forster adds—" The worms which build the bank appear to " secure their dwelling by instinct from the fury of the wind and the foam- " ing sea : they build their coral banks in the tropics, where the wind " almost always blows from the same quarter ; and so raise their habi- " tations, that they form a sort of a circular wall, separating a part of the " sea where the breakers are not so high as in the rest of the ocean." However, this latter remark betrays an imperfect knowledge of coral animals.

Forster's observations of the formation of islands in the South Sea, are ingenious and original, but not always correct. In the year 1814 they were again brought into notice by Captain Flinders, who was of the same opinion as Forster—being led to it by observing a small island in the Torres Straits between New Holland and New Guinea called by him Half-way-island. He himself saw that the islands there were lying near each other in different gradations of formation and perfection. Some of them were finished, but still uninhabited ; others rising above the surface of the water, but as yet void of vegetation : and there were others again which were covered with water by every flood-tide. He writes as follows :—" It appears to me that when the animalculæ " which form the corals in the depth of the sea cease to exist, their

" buildings stick together, either by something adhesive in themselves " or by some peculiarity of the sea water. When the interstices " are filled up with sand and fragments of corals, which are also ad- " hesive, a rocky mass is produced. Future generations of these animals " build upon this rising bank, and when they die, contribute to its spread " and growth. The surprising instinct of these inconsiderable animals " is exhibited in the care which they take to make the first gradations " of their building perpendicular. When their rocky wall, especially in " places where the winds continually blow, has reached the surface, it " forms a parapet, near which, protected against the wind, they can " rear their young without interruption."—With the same instinctive foresight, they build the side of the coral bank which is exposed to the wind from the open sea, generally, if not always, very high and nearly perpendicular, so that it sometimes rises from the depth of 200, and perhaps more, fathoms. It appears necessary to the existence of these animals to be constantly covered with water, for they build only in the crevices of the rocks which are filled with water at low ebb : but coral, sand, and other fragments washed upon it by the waves, stick to it, and thus form a strong mass as high as the flood-tide. Fragments above this height, which are scarcely covered with water, lose their cementing property and remain scattered—thus forming a hillock upon the top of the rocks. The newly finished bank is soon visited by birds; marine plants take root upon it, and mould is formed ; a cocoanut or pandanus fruit is cast upon its shore ; land birds resort thither and carry to it the seeds of plants and trees. Every high flood-tide, and still more every gust of wind makes an addition to it ; it gradually becomes an island, and last of all, man comes and takes possession of it. Peron stated his opinion far more exactly than Captain Flinders ; it fully agrees with both the above mentioned, and had been formed from observations made on the occasion of Captain Baudin's expedition at the same time with that of Captain Flinders ; but his lively imagination ascribed to coral animals such a share of influence upon the formation of the surface of the earth in the tropics, that he mentions 245 islands and portions of land which he supposes to be wholly or in part the productions of coral animals, and which he fancies these microscopical creatures have built from the bottom of the sea and formed into extensive table lands. Peron examined the island of Timor more particularly ; which, with its mountains, he ascribes solely to the work of coral animals, and compared to which, the most stupendous buildings of men are only inconsiderable and paltry. Peron believed,

at that time, that all volcanic elevations of rock and land must have great irregularities in their surface, and as he did not find this in the coral islands visited by him, he clung firmly to the opinion, that the sea must formerly have covered them: but left it to others to explain how this could be possible—contenting himself with stating what he considered the fact.—Peron's Voyage, vol. II., pp. 165 to 192.

After Peron, Adalbert de Chamisso was most assiduously engaged in the examination of coral banks during his voyage round the world with Captain Kotzebue, in the years 1815 to 1818, and to him we owe the first fully detailed description of the coral banks of the South Sea, and a more systematic description of their formation. With the cold penetrating eye of a naturalist, separating that which was probable from that which was possible, De Chamisso observed in a very particular and ingenious manner the island Radak, and described it in a warm lively manner: he gave in one view a much more perfect and vivid description of the general formation of such islands than either Forster or Flinders. What De Chamisso has described in detail, p. 30 and p. 106 of his "*Notices of a Voyage,*" we find at page 187 comprised in one picture, which indeed is not dissimilar to that drawn first by Forster, and after him by Flinders, but which contains much originality in a natural manly manner: it is all from his own experience, and nothing borrowed for the sake of ornament. The following is a sketch of this picture. "The fact that coral islands appear in rows, and that there are many in some, and few in other places, in the same sea, leads to the conclusion that coral animals have erected their buildings upon shallow places or on the summits of submarine mountains, which they increase in height and breadth. The larger kind of coral animals appear to prefer the more agitated parts of the sea: this circumstance causes shells, and fragments of corals to be thrown over the wall raised by them, and thus prevents them from building in the middle; this accounts for the circumstance of the exposed side first reaching the surface. At low water these banks gradually become dry near the surface. The coral animals then cease to build, but the waves wash shells fragments of corals and sea urchins between the rows of coral, and thus by the cementing sand produced by friction being acted upon by the sun, forms one solid mass as hard as a rock. This gradually increases by the same means, and grows in size until it at last becomes so high, that it is only covered by high flood tides. In the

dry season the sun heats the mass of rock to such a degree, that it splits in many places and comes off in layers. The waves pile these flat stones upon each other: coral rocks and limesand are thrown upon them in a similar manner. The limesand forms, and offers to the seed of trees and plants growing on shore, a fertile soil, so that its white ground is soon overshadowed with trees: this is sometimes accelerated by the arrival of full grown trees, which have been washed by torrents from their native soil, and find here a resting place after long wanderings. With these arrive small animals, such as lizards and insects, to be the first inhabitants. Before the trees unite themselves into a forest, sea birds make their nests upon them, stray land birds take refuge in the bushes, and when all is completed, man comes, takes possession of the fertile soil produced by withered and rotten leaves, and calls himself lord and proprietor of a new world." Besides this, Chamisso gives a full description of the circular formation of coral rocks.

An excellent essay on the same subject was written in the year 1823, by Messrs. Quoy and Gaimard, upon a voyage of discovery with Captain Freycinet; it was read in the Acadamie des Sciences at Paris in 1824, and is printed in Annales des Sciences Naturelles, 1825. The opinion of both these learned men is, that the influence of coral animals upon the formation of islands in the South Sea has been exaggerated, and that the phenomena which have been given as proofs, are often erroneous in consequence of their having been superficially examined. This remark is the more important, at it agrees with what is maintained by Leopold von Birch in his description of the Canary islands, 1825; in which he criticises and compares, in a most accurate and scientific manner, the geological accounts of all travellers in the South Sea.

Peron was very sharply reproved by his countrymen for being bigotted to his own opinion, to prove which he injured the truth by making quotations and appealing to authorities, which were founded upon superficial observations. Quoy and Gaimard do not think that the Society Islands, New Ireland, the Lousiade and others, are built wholly or in part by coral animals, but that all of them have a different rock for their foundation, similar to that of other known islands and continents: slate, sandstone, limestone, and even granite, are found upon the various islands of the South Sea. Slate is found even in Timor, from which they imagine that many of the South Sea islands have been produced by volcanoes.

The above mentioned writers describe the manner in which lithophytes build their dwellings upon foundations already existing, of a different nature from their own; and they also point out what circumstances contribute to their growth and elevation, and what do not.

Further, they endeavour to prove that there exists not one island of any consideration constantly inhabited by man, which is entirely built by coral animals; and that these little creatures do not build perpendicular walls from the bottom of the sea, but only from layers and crusts of a few fathoms in thickness.

They say that the polypes which produce stone, increase where there is constantly high temperature, and where the bottom of the sea is cut up in caves enclosing shallow and quiet water, where they are not disturbed by high waves or the trade winds. They build upon submarine rocks, but do not form them; they merely cover them wholly or in part. All circular coral banks of the South Sea, according to their opinion, depend upon the foundation on which they build. Masses of madrepores, are only met with in sloping and shallow cliffs; whilst in agitated places, specimens of a globular shape are seen scattered.

Again, it is true, they admit the fact which has been often told by seafaring men, that there are coral-banks in the South Sea, which rise like walls from a depth which cannot be fathomed; but Quoy and Gaimard contest that these perpendicular walls are not wholly formed by corals.

1. Because the beautiful colours of coral animals can only be produced by the influence of light, which does not exist at a great depth.

2. Because at a depth of several fathoms, none of these animals are seen to grow, much less can they exist at a depth of 1000 or 1200 feet.

3. Because in this case these animals would be the only creatures that could live in all depths, under every pressure of water, in every temperature.

4. The sea at great depths is always in motion, and breaks with tremendous force against the banks, even if not put in motion by wind; now if coral animals build in places not exposed to strong winds, which is a well proved fact, it is certain that the steep walls in the teeth of winds cannot be erected by them. They rather build in shallow places or where they can find a shelter, and thus contribute to diminish the depth of the sea which already is not great.

5. All those walls which people say have been built by coral ani-

mals, have clefts in them, through which the sea can flow. If those circular perpendicular coral banks were built throughout by coral animals, these openings would not be so deep, for coral animals build in solid masses; and could they build up from the depth, these openings would not be formed, whereas they are found in all these walls without exception.

Their reasons for considering it improbable, that any considerable inhabited island has been built throughout by coral animals, are the following.

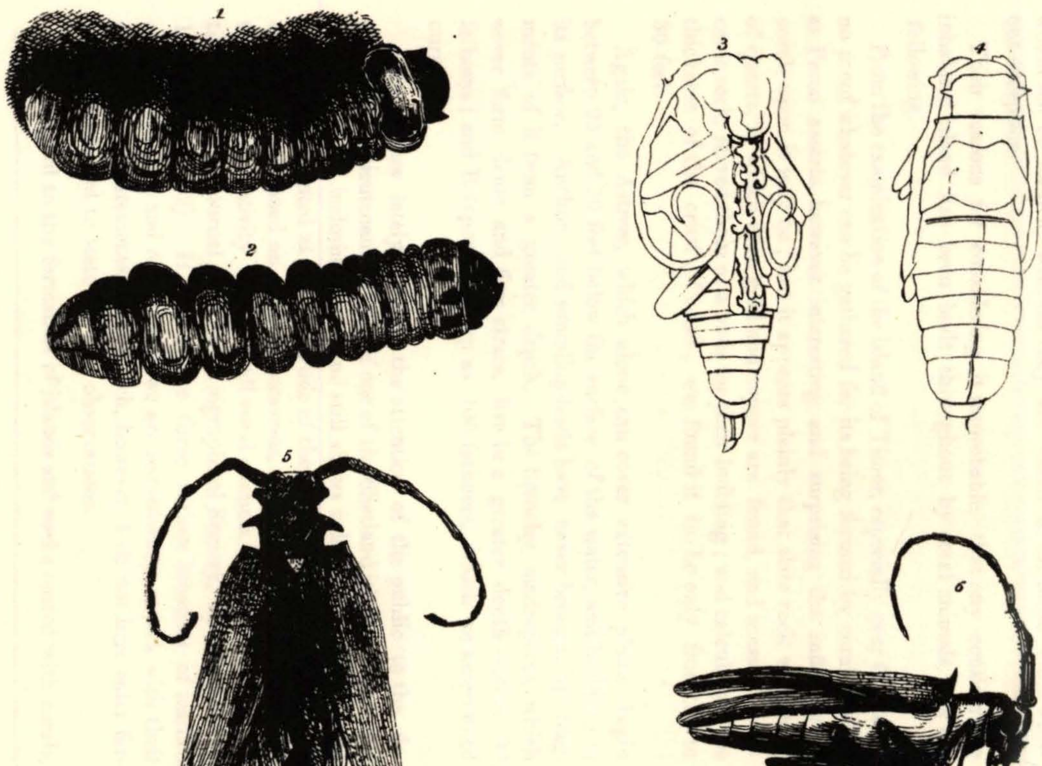
From the examination of the island of Timor, especially near Coupang, no proof whatever can be gathered for its being formed by coral animals as Peron asserts, however interesting and surprising the influence of corals upon it may be; but it appears plainly that slate rock with veins of quartz, in which even gold and copper are found, and masses of volcanic rock, served them as a basis for their building; and calculating the thickness of the crust of corals, we found it to be only from 25 to 30 feet.

Again, the Astreæ, which alone can cover extensive plains, begin between 25 and 30 feet below the surface of the water, and build up to its surface. Anchors and sounding-leads have never brought up fragments of it from a greater depth. The branchy madrepores, which never form dense and firm strata, live in a greater depth—50 or 80 fathoms; and Retepora as deep as 100 fathoms, which we ascertained ourselves.

John Barrow lately directed the attention of the public to the description by Lieutenant Kendal of one of the Shetland islands, which is of a circular form, inclosing a sea, and still shows volcanic activity; at the same time he hinted at the similitude of the coral islands in the Pacific,* which he mentioned on former occasions, whose volcanic basis is, by the surprising activity of the small coral animals, transformed into fertile Islands. (Journal of Royal Geographical Society, Vol. I., London 1830-31, page 62). If we compare these various accounts of learned circumnavigators and naturalists, we are immediately struck with their contradictory statements, upon which, however, I do not here enter farther, but proceed to state my own observations.

With regard to the formation of islands and rocks coated with corals,

* I was not able to meet with these words in Mr. Barrow's works. Perhaps he has the honor to be the first who published that volcanoes were the basis upon which coral banks in the South Sea are erected. Perhaps he only expressed this supposition verbally.


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these naturalists confirm the accounts of their predecessors, one of whom was Forster. For this purpose they examined to their entire satisfaction, the small island of Kera in the bay of Coupang near Timor.

According to an account of De Blainville, in his interesting essay on Zoophytes (Dictionarie des Sciences Naturelles, Article Zoophytes 1830, page 95) Professor Reinhard, who was some time in India, does not believe that Quoy and Gaimard were correct; he rather approves of the representations of Forster and Peron, but gives no particular reasons for it. *(To be continued.)*

VI.—*Note on the destruction of the Adansonia digitata and other trees by a species of Lamia.*

The rapid destruction of the large Adansonia in Colaba, which has been noticed by many of the residents in Bombay, has been effected by the larvæ of a species of capricorn beetle; a correct representation of which, in its several stages, is given in the accompanying lithograph executed at Madras, from a drawing made by Professor Orlebar. This beautiful tree was apparently vigorous and free from disease in August 1840; and it was not till the end of October that I observed, that one of the principal branches was bored by numerous round holes. In January this branch, which Mr. Buist ascertained to be 13 feet in circumference, fell, and a few days after I examined, and found the part which had given way penetrated by irregular cavities filled with gnawed wood. These cavities were of considerable length, and varied from 1½ to ¾ of an inch in width: most of them were empty, but after cutting away part of the wood, I found several to contain the large grub, figures 1 and 2. These were of various sizes, and corresponded more or less nearly to the part of the cavity in which they were found. The destruction of the substance of the branch was great, and with the extreme softness of the wood and the weight of the top, explained the fall of the branch. The crysalis was found at the same time, and an injured specimen of the perfect insect was given me by a horsekeeper. The perfect insect (figs. 5 and 6) was drawn from a specimen brought to Mr. Orlebar by one of the students at the Elphinstone College, whose curiosity had been excited, and who searched for it several days. They have since been found abundantly on this and other trees in the islands. A copy of the drawing was sent to London, and was examined by the Rev. Mr. Hope, President of the Entomological Society, who favored me, through Dr. Royle, with some remarks regarding it, which he also submitted to the Entomological So-

ciety at one of its meetings last winter, (Annals of Natural History, February 1842.) The following is an extract from his letter :—"The "Lamia is Lamia senties of Linneus, and some have confounded Lamia rubus with it, which is an error. I lately mentioned, in a paper "to the Entomological Society, that the ravages produced by Lucanus "and Lamia, must cause great destruction in an Indian forest, and re-"gretted that I could not substantiate the facts. Your letter gives "ample evidence of the powers which these minims of creation possess, "and confirms my previous view."

The almost total destruction of this great tree, which is 44 feet in circumference, in little more than a year, is a very remarkable fact, and certainly does afford a strong confirmation of Mr. Hope's views; but the destruction of the tree, which he proposes as a means of checking the evil, does not seem to be requisite, as the trees in the neighbourhood do not appear to be attacked, —disease, if it may be so called, spreading from the part first affected, like an ulcer, one branch falling after another as they decay extends round the trunk. The bark is left untouched, except by a few round holes, caused, I believe, by the full-grown insects eating their way out. Probably trees having hard wood are not liable to be attacked. I extracted many years ago, at Hyderabad, a similar grub from the Horse Raddish tree (Hyperanthera Moringa); and many fine graft Mango trees were destroyed or injured at the same time, in the neighbouring station of Bolarum, by a similar insect. The gardeners endeavoured to get rid of the evil by cutting into the tree and removing the part attacked, but I believe, without much success, as it was not discovered till the round hole made by the perfect insect eating its way out, showed that it had already made some progress. The cocoanut trees in Travancore and Malabar are often destroyed by the young leaves of the head being devoured by a grub, probably of the same family. I have heard that this insect is eaten by the natives.* A distinguished naturalist, Mr. F. D. Bennet, in his Narrative of a Whaling Voyage round the world, mentions, that at the Island of Timor a wooding party from the ship "brought him the *Larvæ* of a "gigantic beetle, which had been found in the trunk of a tree. It was "of that kind usually eaten by the Malays, and which, when preserv-"ed in sugar, is also esteemed a delicacy by the Chinese. Its body

* This custom is not peculiar to the East, if we may judge from the name of a species common in the North of Europe, *Lamia dilis*.

"is soft, of a delicate whiteness, and, in addition to the normal mem-"bers, has on the back a series of false feet similar to those that ob-"tain in the Cerambyx family of beetles."

The name given by Linneus to the insect found in the Adansonia is Cerambyx sentis not Lamia sentis, as mentioned by Mr. Hope,—the genus Lamia having been separated from the great tribe of insects classed by Linneus under the former name. He mentions that the "larvæ of the Cerambyces bore through the inner part of trees, pul-"verising the wood, and are transformed into perfect insects in the "cavities they make."

A similar observation is made by La Marck regarding the whole family, which he has divided into ten genera : "Tous ces insects, sont phytiphages, et dans le plupart les larves ne vivent que de la substance du bois : elles font beaucoup de tort aux arbres, surtout celles des grandes espèces." It is remarkable, however, that in the edition of this celebrated work, now in course of publication by Dr. Milne Edwards and M. Deshayes, while the Leptura and other genera are said to live on the substance of trees and the roots of living vegetables, the Lamias are mentioned as being found *on* trees and other plants. It would be interesting to ascertain what species attack particulur trees, and whether the same species are found in different parts of India. As the Adansonia is most probably not a native of this country, it is not likely that the insect is peculiar to it, and indeed they are found on different trees in the neighbourhood, although the great softness of the wood of the Baobab tree appears to render it the favourite nursery for the young.

It is useless to repeat the old assertion of Adanson regarding the antidiluvian age of this tree, to which Mr. Lyell has given a very absurd notoriety. There are some interesting remarks on this subject in the *Bombay Times* of the 8th June last, where it is stated, on the authority of Dr. Wilson, that the tree was introduced by the Portuguese from the Mozambique within the last three hundred years. This is not improbable, but it would be desirable to have some particulars as to the authority on which it is stated, as it is very likely that a tree so remarkable, and in some respects so useful, and which abounds along the shores of the Red Sea, was introduced at an earlier period. In a note accompanying the fruit of this tree received from Lieut. Blake, 7th Regt. N. I., it is mentioned that it was introduced into Mandoo, the ancient capital of Malwa, amongst the ruins of which it still flourishes, by the Khiljee race of Kings ; probably therefore between A. D. 1404, when Hoshung Shal, the founder of the dynasty, re-

moved the seat of government to Mandoo, and 1502 when the kingdom began to be dismembered. It is there called the Khorosani Imlis. In Ceylon and the South of India it is known under the name of the Ethiopian Sour Gourd or Tamarind (Imli), for which last it is used as a substitute, as it was in Egypt many centuries ago.

Large Adansonias are found along the roads of many modern cantonments in India, where they could not have been planted 50 years ago; and the Colaba tree, although hastening to decay, has increased so rapidly during the last 18 months, as to have pushed down a wall, beyond the inner line of which it now projects considerably.

The concentric layers of this tree are very remarkable, but have no connection with the annual rings of the trees of temperate climates; yet it would be satisfactory to ascertain their real nature, and also their number, in trees the age of which can be ascertained.

Bombay, 30th June, 1812. JOHN G. MALCOLMSON.

VII.—A valuable collection of Iron ores from Malwan and Gotney, in the Rutnagherry district, presented to the Geographical Society by C. A. Elphinstone, Esq., having been arranged in the Museum of the Bombay Branch of the Royal Asiatic Society, we insert two official reports respecting the first mentioned ore, which, we believe, will be new to most of our readers, although they have already appeared in the proceedings of the Bombay Chamber of Commerce.

Extract of a letter from the Honourable the Court of Directors in the Public Department, No. 31, dated the 20th November 1839.

Forwarding a Specimen of Iron ore, found at Malwan near the Sea, in order that its properties may be ascertained by the Court.

Para. 48. We transmit as a number in the packet, a report by Dr. J. Forbes Royle on this specimen of iron ore, which appears to be of good quality.

Report on a specimen of iron ore from Malwan in the Southern Concan, by J. Forbes Royle, M. D.

Ores of iron, as is well known, are extremely diffused throughout India, as in the Himalayas, in the Rajmahal Hills, in the Mysore and Carnatic, and also in the Sichel Hills, especially near Neermull.

The ore of iron which has been so extensively worked in the Porto Novo works, in the district of Salem, occurs there in low hills and in great quantities at the surface. It is the magnetic oxide of iron combined with quartz. The ore varies much in appearance according as the grains of quartz and oxide of iron are large or small, but the proportion in which the component parts unite is nearly uniform, that is, about 48 of quartz and 52 of oxide of iron are found in 100 parts by weight. The oxide itself consists of 72 per cent. of iron with 28 of oxygen. The ore is prepared by stamping, and then separating the

quartz by washing or winnowing. The fuel is charcoal, upon which the ore is laid, without flux, the bellows are plied for four hours when the ore is found to be reduced; it is taken out while yet red hot; it is cut through with a hatchet and sold to the blacksmiths, who forge it into bars and convert it into steel. It is forged by repeated hammering until it forms an apparently unpromising bar of iron, but which the Hindoo converts into steel of the best quality. To effect this, he cuts it into small pieces, of which he puts a pound more or less into a crucible, with dried leaves of the *Cassia Auriculata,* and a few green leaves of *Asclepias gigantea,* or, when this is not to be had, of the *convolvulus laurifolius.* The object of this is to furnish carbon to the iron. The crucibles clayed over, and about 20 or 24 in number, are built up in the form of an arch in a small furnace and charcoal heaped over them. The blast is kept up for about 2½ hours; when cool, the crucibles are broken and the steel taken out, which is of most excellent quality, but the native process is so imperfect that of 72 per cent. of which the oxide is composed only 15 per cent. of iron is obtained.

In the Sichel hills or Neermull Range where hornblende slate occurs resting on granite or quartz rock, magnetic iron ore is also found, from which is made the *woatz* steel employed for ages in making Damascus sword blades. The minute scales of iron ore are diffused in a sandstone looking gneiss or micaceous schist passing by insensible degrees into hornblende slate. This reduced to a sand is washed in shelving depressions, and the heavier particles thus retained are smelted with charcoal in small furnaces. The iron obtained has, according to Mr. Malcolmson, the remarkable property of being at once in a perfectly tough and malleable state.

As the accounts of these two ores are adduced for the purpose of comparison, it may also be stated for the same purpose, that almost all the celebrated iron mines of Sweden consist of common magnetic iron ore, while those of Orendal in Norway consist of the granular variety or which is commonly called iron sand. Siberia, Elba, Sweden, and the Hartz yield the most powerful magnets, which are also found in some of the mountains of Central India.

The Swedish bar iron, prepared entirely from the magnetic iron-stone of Dannemora, is smelted either alone (or mixed with limestone if it require any flux) with charcoal; and in most of the countries of Europe where charcoal is usually alone employed, the process is very similar to the Swedish. In England less rich ores are smelted with the assistance of different fluxes, and coke for fuel; but the process is more complicated as well as the apparatus, but is made profitable from the application of science and great practical skill, as well as from the occurrence of iron ore in the vicinity of coal.

The native steel of Gisemhartz is prepared directly from the ore nearly in the same way as common bar iron—no flux of any kind is necessary, and the fuel, which is charcoal, does not on an average exceed in weight one-fifth of the ore.

The specimen of Bombay iron ore submitted for examination is

described as being found in a rocky soil in the town of Malwan in the Southern Concan. The spot is close to the sea, and the ore is dug out in quantities at a very small depth below the surface. There is another mine (formerly worked it is believed) about 4 miles north of Malwan.

This ore has been examined by Mr. Tennant, Lecturer on Mineralogy at King's College, and has been seen by professor Daniell and also by Mr. Lonsdale, Assistant Secretary of the Geological Society.

It is different from the Salem ore, and also from that of the Neermull Range, inasmuch as it is but slightly magnetic, while they like Swedish ore are highly magnetic, and attract iron filings. This is of the kind called micaceous or specular iron ore, and generally occurs in primary rocks in Scotland, England, Norway, and especially in the Isle of Elba, also in Saxony, in Bohemia in beds of mica slate, at St. Gothard, &c. An ore very similar to that of Malwan occurs at Tavistock in Devonshire, and at Dunkeld in Perthshire. Mr. Tennant has specimens something like it from Brazil, in which gold is found, and which appears to be mechanically disseminated through the ore.

The specimen of ore sent consists of a very large proportion of the oxide, with reddish granular quartz (that is granular quartz coloured by iron,) disseminated through it. The proportion cannot be ascertained without destroying the specimen, and therefore several of different degrees of richness ought to be submitted to examination in order to form a correct idea of the value of the ore. The oxide, or more properly peroxide, consists of iron 69 parts, and oxygen 31, in every hundred, and is therefore very nearly as rich as the magnetic iron ore, which consists of peroxide of iron 69, and of the protoxide of iron 31 parts. It may however contain other impurities, which will be revealed to chemical annalysis. It is probable that both magnetic iron ore and common specular iron ore may be found in the vicinity.

The value of this ore will depend not only upon the facility of extraction and of transport, which appears to be great, but also upon the richness of the ore, which cannot be judged of by a single hand specimen, as the best are usually selected. Information should also be communicated respecting the existence of any flux, such as limestone, in its vicinity, as this might be required. Also on the comparative scarcity or abundance of fuel, of which charcoal is the most eligible for this ore.

As the Malwan iron ore most resembles that of Elba, among the ores which are worked in Europe, it may be mentioned that the process adopted somewhat resembles the Indian method, as the ore broken into small pieces is heaped upon a bed of charcoal in a very simple reverbatory furnace. When the whole has been glowing hot for some time, the pieces being now soft and at a welding heat, are, by the dexterous management of the workmen, brought in close contact with each other by means of an iron bar. They are then lightly hammered while still in the furnace, and thus the whole mass acquires sufficient compactness to be removed to the anvil without falling in pieces ; it is

now hammered with a gradually increasing force, the earthy impurities are thrown off, together with the scales of black oxide, the lump is divided into pieces of a convenient size, which, by repeated heating and hammering, are drawn into bars. This iron is of excellent quality and about 50 to 75 per cent. are obtained out of the ore, but owing to the scarcity of fuel, the ore is embarked and taken to the mainland to be smelted as it was when Strabo wrote.

Common specular iron ore generally yields an excellent malleable iron but somewhat hard, and also a good, but not the very best, cast iron.

The second kind of specular iron ore, called more specially micaceous iron ore, is found in the general way to smelt more easily than the preceding, provided a sufficient quantity of limestone is added to it by way of flux. The iron that it affords is some times cold, short, but is well fitted for cast ware.

Report by Dr. Gibson *on the Iron Ore found at Malwan.*

Dapooree, 28th November 1840.

In obedience to the orders of Government I proceeded in October to Malwan.

Having arrived there, I made enquiry as to the seat of the Iron Ore, whereof specimens had been furnished to me 9 years ago. I found that several veins existed in the immediate neighbourhood of the Kutcherry. Not more than three of these veins were visible on the surface. Of these, two were opened by me. I found the breadth in each vein to vary from 4 to 6 inches, and from these the ore was broken out vertically from between the rifts of the quartz rock wherein it was imbedded—the other side of the vein being often formed of sandstone.

I was unable in any case to trace a vein to a longer extent than 8 feet on the surface. Beyond that extent the rock dipped considerably below the surface, and from the want of proper mining tools I could not break up the veins to a greater depth than 18 inches. The specimens sent will many of them show the full breadth of the vein, and will moreover be found frequently to exhibit the appearance of lumps of solid metal.

On the depth to which these veins extend will the value of the deposits depend. I could not learn that such veins were found in other parts. Analogy and presumptive evidence will lead to the belief that the veins at some distance below the surface may be at least as rich as those which appear superficially, and this belief is further strengthened by observing the immense blocks of quartz rock which abut into the sea, particularly on the side W. S. W. of the Kutcherry. These in their fractures, both horizontal and vertical, appear as if they had been jointed by Iron which had rusted away under the continued action of salt water, and therefore the probability is strengthened that at some distance from the surface, large veins of the pure ore may be found. As to the productiveness of the two veins opened by me,

I may state, that by the labour of a man and boy employed for three days, and having for tools only a pickaxe and crowbar, I raised about 1200 lbs. of good ore.

Of this quantity I deemed that about 200 lbs. might be sufficient for the experimental purposes to which it was intended to be applied by the Hon'ble the Court of Directors. A second portion of the ore I made over to the Assistant Assay Master, as that Gentleman wished to test its value for the fabrication of the finer description of tools, and I knew that no one was better able to do so.

The third and larger portion I made over to a member of the Chamber of Commerce in Bombay, who was most desirous immediately to try its value, in the home market, and to ascertain its feasibility by the great Iron Furnaces in Scotland. Along with Iron Ore specially reported on, I have also forwarded a considerable quantity of the red or Ocherous Iron Ore found in great quantities throughout the Konkan, but specially towards Malwan and Vingorla. Also two specimens of very rich Ocherous Ore found at the village of Gotney in the Rutnagherry Zillah. These latter were kindly handed to me by A. Elphinstone, Esq. The village is situated on the Ghats and at a distance from water carriage.

As to the common Red Ore of the country it seems to prevail throughout, and in the Malwan and Vingorla districts, there are many settlements of smelting establishments; but these are on a small and miserable scale, and if we can credit the returns and the appearance of the workmen, they earn but a bare subsistence. The process they follow differs in no respect from that followed in other districts, where this ore is found, and consists in roasting, pulverising and afterwards smelting the ore. My main object in noticing this red ore is to point out its great abundance, the extreme facility with which it is dug out, and its proximity to the numerous navigable creeks which intersect the Konkan. An analysis of the specimens of it, which have been forwarded, will show whether it is likely to be of any value as a dead weight for export.

The more pure and rich ore now specially under report being found so near the surface as above described, it may be asked why it has never been worked by the natives? The fact is, that it is too refractory for any heat which they can apply, and appears to be tangible only by the heat of our more powerful European furnaces.

In conclusion, I may, for the guidance of the practical Geologist, give a sketch such as my limited knowledge enables me to do, of the geological features of the district in which this ore is found. The surface present a wide table of laterite formation, in some situations level with the sea, and in others swelling into small rounded hills gene ally thickly wooded, or into bare elevated plains nearly destitute of soil.

Below this lateritious crust appear in some situations, or in the Ramghur district, immense veins of Talc associated with and running into quartz rock, and having an angle upwards of 45° with the surface of the ground and a westerly dip.

This Talc is excavated by the people, and made up or rather shaped out into cooking pots, eating dishes, &c., and in this way a trifling traffic is carried on—such vessels are valuable to the Chemists, as they are said to be capable of resisting the most intense heat.

I find on referring to Captain Herbert's survey of the mineral productions of the Himalaya, that a trade is carried on in vessels made of this stone to the extent of 40,000 piastres, equal to about 81,000 Rupees. Further, Captain Herbert states, that in the Himalaya, as well as in Ireland, Talc, when existing along with primary rocks, has been found to be associated with Copper Ore.

3. In situations where the overlying laterite had from some local cause (qu: the prevalence of lime?) been completely disintegrated into a pastry red clay—below this, I remarked extensive beds of white and soft pipeclay looking substance, originating possibly from the extensive decomposition of quartz rock. I have not yet leisure to examine this substance, nor can I yet say whether it can be turned to any account in the arts—but specimens of this and of all the other minerals found in that part of the country have been sent to Dr. Heddle for the museum of the Geographical Society. Sandstone, I have not observed in the district, save in detached masses associated with quartz rock and bright Iron ore.

The lowest formation visible is this quartz rock, very hard, and in many places curiously mottled by the outlines of what seem at one time to have been solid nodules imbedded in the more liquid surrounding rock, but are now of one substance with it, varying from it only in colour.

This quartz rock is remarked by its nearly vertical forms in the beds of the deeper rivers, and appearing extensively below the laterite on the sea shore.

On the whole, the district seems well worthy an attentive examination by the Geologist.

As the nature of my duties afforded me an eligible opportunity for examining the Teak plantations of the Southern Konkan, I deemed that I should be acting in accordance to the wishes of Government by visiting these, and for the inspection of such portions of the said Plantations, as I could not conveniently visit in person, I detached a trust-worthy Peon of the Garden's Establishment, accompanied by a Karkoon, whom I had (with permission of Government) hired for two months for the purpose of assisting in the examination of alluvial soils, and as I had no further use for his services in that branch of enquiry, I turned them to account in the examinations of plantations. As both this man and the Peon had been employed with me in the Northern Konkan and Petti country, on similar duty, they had some experience on the subject—the results of the Examination made, and observations arising out of it, will be found in Report No. 2.

(Signed) Alexander Gibson,

Supt. Bot. Garden.

METEOROLOGICAL OBSERVATIONS, BOMBAY OBSERVATORY.

21st OCTOBER, 1841.

Bombay mean time.	Hour.	Barometer.	Thermom. Attad.	Thermom. Detad	Thermom. Dry.	Thermom. Wet.	Corrected Barometer.	Winds.	Remarks.
6	A. M.	29·870	79·0	78·6	79·0	75·0	29·730	S. by W.	Sky clear with cirro stratus.
7	...	·876	79·0	79·0	79·4	77·0	·736	S. E.	
8	...	·900	80·0	80·2	80·2	77·0	·757		
9	...	·904	81·3	81·4	81·4	77·0	·757		
9½	...	·900	82·0	82·2	82·2	77·0	·751		
10	...	·900	83·0	82·4	82·8	75·0	·748	S. E.	
10½	...	·894	83·0	83·6	83·8	75·2	·742		
11	...	·870	84·8	84·6	84·5	76·0	·712	S. W.	
0	...	·860	86·2	86·0	86·0	76·8	·689		
1	P. M.	·826	87·2	87·0	87·0	78·8	·662		
2	...	·819	88·2	87·4	87·4	78·0	·651	W. S.	Sky clear with cumuli stratus.
2½	...	·818	88·2	87·3	87·4	77·8	·651		
3	...	·812	88·0	86·8	87·2	78·0	·646	W.	
3½	...	·808	88·0	86·0	86·6	77·0	·642	W. N.	
4	...	·809	87·5	85·5	85·8	77·0	·643		
4½	...	·802	80·8	84·8	85·2	76·9	·639		
5	...	·816	86·0	84·2	84·6	76·5	·655		
5½	...	·824	85·0	83·4	83·8	76·5	·666		[6h. 12m.
6	...	·822	84·0	82·2	83·2	76·5	·667	....	Sky clear. Lightning in the E.
7	...	·850	82·6	81·8	82·2	76·0	·693	....	,, ,, { in the N. E. 6h. 22m. { in the W. 7h. 25m.
8	...	·878	82·2	81·6	82·2	76·0	·728	....	in the E. { in the N. 7h. 27m.
9	...	·872	82·0	81·6	82·3	77·0	·723	Calm ...	Clear.
9½	...	·880	82·0	81·6	82·3	77·0	·731	....	Clear. Lightning in the N. E.
10	...	·893	82·0	81·5	81·8	77·0	·747	....	Sky clear. [9h. 30m.
10½	...	·884	81·5	81·2	81·6	76·5	·736	....	Sky clear. Lightning in the E.
11	...	·890	91·2	81·2	81·6	78·0	·744		
0	...	·880	81·0	80·6	81·2	76·8	·734	....	Cumulus in the N. and E. Light-
1	A. M.	·872	80·5	80·4	80·6	76·0	·727		[ning in the E.
2	...	·850	80·5	80·0	80·4	76·0	·705	Calm ...	
2½	...	·884	80·2	79·8	80·4	76·0	·740		
3	...	·882	80·0	79·4	80·2	75·8	·739		
3½	...	·884	80·0	79·3	80·0	75·8	·741		
4	...	·849	79·8	79·1	80·0	75·5	·706		
4½	...	·840	79·8	79·0	79·8	75·5	·697		
5	...	·846	79·5	78·8	78·7	75·0	·704	....	Cumulus without Lightning.
5½	...	·844	79·5	78·8	79·0	76·0	·702		

22ND NOVEMBER, 1841.

Hour.	Bombay mean time.	Barometer.	Thermom. Attad.	Thermom. Detad.	Thermom. Dry.	Thermom. Wet.	Corrected Barometer.	Winds.	REMARKS.
A. M.	6	29·930	76·0	74·4	73·6	71·0	29·700	N. E.	Clear in the zenith with cumuli
...	7	·956	75·0	73·5	73 4	70·0	·828	....	Cumuli. [in the horizon.
...	8	·990	75·8	75·4	75·0	70·8	·849	....	Cumuli in N. E. passing to the
...	9	·992	76·8	77·0	77·2	71·0	·858	E.	[W.
...	9½	·989	76·0	...	...	...	·858	....	Cumuli all round the horizon.
...	10	·988	78·2	78·3	78·0	72·1	·850		[Mass in the west passing to E.
...	10½	·989	79·0	79·2	79·8	72·0	·849	....	Cumuli in the horizon. Masses in
...	11	·930	79·8	80·2	80·8	72·8	·837	N. W.	,, Mass in the N. & E. [the N.
...	0	·950	81·0	81·3	81·2	72·0	·804	....	,, Masses in the N. and S. E.
P. M.	1	·920	81·5	81·0	81·6	71·5	·772		
...	2	·893	81·9	81·1	81·8	71·4	·739	....	Large cumuli in the N. E. & S.
...	2½	·890	81·9	81·2	81·2	71·6	·737		
...	3	·886	81·0	80·9	81·0	72·0	·739	....	A few large cumuli in the N. S.
...	3½	·884	81·6	80·9	81·0	71·6	·736		[and E.
...	4	·882	81·4	80·7	80·8	71·0	·733		
...	4½	·882	81·0	80·4	80·6	70·2	·732	....	Cumuli in the East
...	5	·894	80·8	80·4	80·0	70·8	·738	....	,, in the West.
...	5½	·900	80·1	79·4	79·1	71·0	·757	....	,, in the E. and W. Zenith clear.
...	6	·900	80·0	79·2	79·0	70·8	·757	N.	
...	7	·922	79·2	78·0	78·6	71·0	·791	....	Sky clear.
...	8	·936	70·0	78·4	78·4	71·5	·796		
...	9	·950	78·0	78·0	77·4	72·5	·811	N. E.	
...	9½	·950	78·8	77·8	77·2	71·8	·811		
...	10	·950	78·1	77·2	76·4	70·5	·813		
...	10½	·930	78·0	76·8	76·2	70·8	·813		
...	11	·948	77·6	76·8	76·2	71·4	·814	....	A few cirri.
...	0	·946	77·5	76·7	76·2	71·8	·812		
A. M.	1	·930	77·3	76·6	76·0	71·0	·795	....	Sky clear.
...	2	·916	77·0	76·5	76·0	70·8	·782		
...	2½	·916	77·0	76·3	76·0	70·8	·782		
...	3	·924	70·8	76·0	76·0	70·8	·799		
...	3½	·920	76·5	76·0	75·6	71·8	·787		
...	4	·920	76·4	76·0	75·5	71·6	·786		
...	4½	·918	76·4	76·0	75·3	71·5	·788		
...	5	·924	76·4	76·0	75·2	72·0	·792	....	Cirrus with cumuli in the E.
...	5½	·940	76·2	75·8	75·2	71·8	·808		

21st DECEMBER, 1841.

Hour.	Barometer.	Thermom.		Diff.	Attad. Thermometer.	Detad. Thermometer.*	Remarks.
		Dry.	Wet.				
0	29·887	72·2	66·5	5·7	73·6	72·5	
1	·874	71·6	67·0	4·6	73·2	72·2	
2	·868	71·0	67·0	4·0	73·0	71·7	
2½	·868	71·0	66·6	4·4	73·0	71·6	
3	·868	71·0	66·6	4·4	72·9	71·6	
3½	·870	71·5	65·5	6·0	72·8	71·9	
4	·864	71·8	66·5	5·3	72·8	72·0	
4½	·872	71·2	65·8	5·4	72·5	71·8	
5	...	70·3	65·0	5·3	72·0	70·7	
5½	·880	70·3	65·0	5·3	72·0	70·7	
6	·896	69·7	65·0	4·7	71·7	70·0	Clear.
7	·903	69·0	62·0	7·0	70·7	69·0	
8	·936	71·4	65·0	6·4	71·0	71·0	Cumulus in the West.
9	·974	74·3	66·0	8·3	73·2	74·5	
9½	·984	75·2	67·0	8·2	74·0	75·3	Clear with cirri and cum.
10	·974	76·0	67·0	9·0	75·0	76·4	
10½	·956	76·7	70·0	6·7	76·0	77·0	
11	·950	76·7	70·0	6·7	76·2	77·0	
0	·920	77·0	70·0	7·0	77·0	77·0	Clear with cum. N. W.
1	·894	77·0	68·8	8·2	77·2	77·0	
2	·872	77·5	70 0	7·5	78·0	77·7	Clear.
2½	·872	78·0	69·8	8·2	78·4	77·8	
3	·872	78·5	70·0	8·5	79·0	78·0	
3½	·872	78·6	69·3	9 3	79·0	73·0	
4	·876	78·6	69·3	9 3	79·0	78·0	
4½	·860	78·0	68·0	10·0	79·0	77·9	Fresh breeze. Cirri E.
5	·880	77·0	68·5	8·5	78·5	77·3	Clear.
5½	...	...	...	...	...	...	
6	·880	76·0	68·8	7·2	77·0	76·2	
7	·920	75·6	69·0	6·6	76·1	75·7	
8	·940	75·1	69·0	6·1	75·9	75·4	
9	·940	74·4	69·6	4·8	75·5	75·5	
9½	·910	73·8	68·0	5·8	75·0	74·6	
10	·938	73·0	67·0	6·0	74·6	74·0	
10½	·936	72·6	66·0	6 6	74·2	73·2	
11	·926	72·0	67·4	4·6	73·5	72·5	

* This last column contains the observations of the Standard Thermometer. Sky clear.